Analyzing the Structure of Urdu NPs with Multiple Genitives

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Abstract

In this article the syntactic structure of those noun phrases of Urdu is explored in which there are multiple instances of genitive marked elements. The structural ambiguities in such phrases are described. It is shown that only the attributive genitive modifiers stack together at the same level to modify the head noun otherwise there is always a hierarchical structure for the genitive modifiers. The nominals which license genitive marked arguments are described and their classification is given. This classification will help building an enriched lexicon for the development of a computational grammar for Urdu.

1. Introduction

The form *kaa* in Urdu-Hindi originated from the past participle form of the Indo-Aryan verb *kar-* 'do'. It inflects for gender, number and case and agrees with the head noun: *kaa* (M.Sg.Dir), *ke* (M.Sg.Obl/M.Pl), *kii* (F) [1]. This form is traced back to a Prakrit past participle form *keraa* that is further traced back to Sanskrit past participle form *kritaa*. The evidence for it is provided by Beames [2] who has given the example, *kapi-kritam vacanam* 'speech made by monkey' or alternatively 'speech of the monkey'. The inflected forms *keraa, kerii, kere* were in use in old Hindi. The possessive/genitive forms of pronouns were made by adding these forms to them. Later the first syllable of these forms was lost and only the second one was retained with some forms of the pronouns and hence Hindi-Urdu now uses *meraa, teraa*, etc. as possessive pronouns. But with some other forms of pronouns and all nouns the forms *kaa, kii, ke* began to be used.

Based on some tests to distinguish affixes and clitics by Miller [3] and Zwicky [4], Butt and King [5] have analyzed these forms as clitics. One of the test is that these have scope over noun coordination and the other is that some other element can intervene between these endings and the nominal host. The most frequent use of these clitics is that they mark possessive nouns, that is, these generally express possession or *have-a* relation. Consider the following instances of genitive phrases.

(1) a. ندا کی کتاب
    nidaa=kii   kitaab
    Nida.F.3Sg=Gen.F book.F.3Sg
    'Nida's book'
  b. کتاب کا ورق
    kitaab=kA   varq
    book.F.3Sg=Gen.M.3Sg page.M.3Sg
    'The page of a book'

Both of instances in (1) show a *have-a* relation. Although the genitive markers are hosted on the modifier noun, these show agreement of number and gender with the head noun. Another requirement for a genitive phrase to be grammatical is that the host of the genitive marker should be in oblique form. If some genitive phrase hosts a genitive marker then both the head noun and the genitive marker in the host genitive phrase will be in oblique form.

(2) a. بچے کا کھلونا
    bace=kaa   kHilonaa
    child.M.3Sg.Obl=Gen.M.3Sg.Dir toy.M.3Sg.Dir
    'A child's toy'
  b. بچے کے کھلونے کی قیمت
    [bace=ke   kHilone]=kii qiimat
    child.Obl=Gen.Obl toy.Obl=Gen.F price.F
    'The price of a child's toy'

In (2a) the host of the genitive marker *bacaa* 'child' is in its oblique form. When the whole genitive phrase in (2a) hosts another genitive marker as in (2b) then both the head noun *kHilonaa* 'toy' and the genitive marker *kaa* in the phrase become oblique. Such is the morpho-syntactic behavior of genitive markers in Urdu. In addition to possession there are so many other relations

that are expressed by genitive markers [6]. To explore all these relations is not in the scope of this paper. The rest of the paper is organized as follows. Section 2 analyzes the structure of genitive phrases with multiple instances of genitive marked nouns. Section 3 describes the genitive marked arguments with the verbal elements and provides the classification of nouns based on genitive marked arguments. An implementation in the LFG (Lexical Functional Grammar) framework is discussed in section 4. Section 5 concludes the paper.

2. Structure of Genitive Phrases with Multiple Genitive Modifiers

Both flat and hierarchical structures of genitive phrases with multiple instances of genitive marked nouns are possible. Consider[1] the following example.

(3) a. علی کی چاندی کی انگوٹھی
    alii=kii   caañdii=kii añguuTHii
    Ali=Gen.F silver=Gen.F ring.F.3Sg
    'Ali's silver-ring' OR
    'The ring of Ali's silver'
  b. ندا کا سونے کا کنگن
    nidaa=kaa   sone=kaa   kañgan
    Nida=Gen.Sg gold.Obl=Gen.Sg bracelet.M
    'Nida's golden ring'

For (3a), the following three bracketing structures could all be assumed.

(i)   [alii=kii [caañdii=kii añguuTHii]]
(ii) [[alii=kii caañdii]=kii añguuTHii]
(iii) [alii=kii caañdii=kii añguuTHii]

The first two are the plausible structures for the genitive phrase and are both hierarchical. In (i) the head noun *añguuTHii* 'ring' is modified by the genitive marked element *caañdii=kii* 'of silver' and then the resulting genitive phrase is modified by another genitive marked element *alii=kii* 'of Ali'. In the second bracketing structure (ii), first the noun *caandii* 'silver' is modified by *alii=kii* 'of Ali' and then the genitive marker is attached to this phrase to modify the head noun *añguuTHii* 'ring'. In (iii) the

head noun *añguuTHii* 'ring' is modified by two modifiers *alii=kii* 'of Ali' and *caañdii=kii* 'of silver'.

Three structures for a noun phrase with two genitive modifiers are not always possible. For example in (3b) the bracketing structure [[nidaa=kaa sone]=kaa kañgan] is not possible due to morpho-syntactic behavior of the genitive markers. Here, a genitive marker is supposed to be attached with an another genitive phrase *nidaa=kaa sone* 'Nida's gold' in which the genitive marker *kaa* does not show the agreement of case with the head noun *sone* 'gold'. So the hierarchical structure like (ii) can not be assumed for (3b).

The flat structure for both instances in (3) is not plausible in that the two genitive modifiers cannot alternate their positions (4). So we cannot say that the two modifiers are modifying the head noun at the same level.

(4) a. * چاندی کی علی کی انگوٹھی
    * caañdii=kii   alii=kii   añguuTHii
    silver=Gen.F.Sg Ali=Gen.F.Sg ring.F.Sg
    'Ali's silver ring'
  b. * سونے کا ندا کا کنگن
    * sone=kaa   nidaa=kaa   kañgan
    gold=Gen.M.Sg Nida=Gen.M.Sg bracelet.M
    'Nida's golden ring'

One can argue that (4) is ungrammatical rather due to another reason that the possessive modifier is not the most prominent (the outer most). In (5) there is no possessive modifier and still only one order (5a) of genitive marked elements is grammatical. Some more instances of genitive phrases where a flat structure of genitive modifiers is not possible are given in (6).

(5) a. ملتان کے مٹی کے برتن
    multaan=ke   maTTii=ke   bartan
    Multan=Gen.M.PL clay=Gen.M.Pl pot.M.Pl
    'Ceramic pots of Multan'
  b. * مٹی کے ملتان کے برتن
    * maTTii=ke   multaan=ke   bartan
    clay=Gen.M.Pl Multan=Gen.M.Pl pot.M.Pl
    'Ceramic pots of Multan'

(6) a. علی کی بیوی کی انگوٹھی
    alli=kii   biivii=kii añguuTHii
    Ali=Gen.F wife=Gen.F ring.F.Sg
    'The ring of Ali's wife'
  b. علی کی گھڑی کی قیمت
    alii=kii   gHaRii=kii qiimat
    Ali=Gen.F watch=Gen.F price.F.Sg
    'The price of Ali's watch'

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[1] In the transcription scheme, consider 'a', 'i', 'u' as short vowels and 'aa', 'ii', 'uu' as long vowels. The equal symbol '=' marks a clitic boundary. Glosses used in this paper are as follows: 1,2,3 stand for 1st, 2nd and 3rd person, respectively; Gen=genitive, Dir=direct case, Obl=oblique case, Sg=Singular, Pl=Plural, Inf=Infinitive.

The noun that opens a position for another nominal is called the relational element [7]. The noun *biivii* 'wife' in (6a) is a relational element and the modifier *alii=kii* makes a constituent with this noun. In (6b) the head noun *qiimat* 'price' actually is an attribute and this attribute can only be of *gHaRii* 'watch'. So (6a) and (6b) both have hierarchical structures as illustrated below.

(i) [[alii=kii biivii]=kii añguuTHii]
(ii) [[alii=kii gHaRii]=kii qiimat]

The hierarchical structure could be deep on either side depending upon the semantics of participants in genitive phrases.

2.1. Attributive Genitive Modifiers

The list of some attributes and their examples is given in Table 1. Attributive genitive modifiers here are taken to be those genitive modifiers which result after adding a genitive marker to some attribute of the head noun. More than one attributive genitive element can modify the head noun at the same level. That is, a genitive phrase with multiple attributive genitive modifiers has a flat structure.

Nr.	Attribute	Example/Value
1	Material	gold, clay
2	Price	10 rupees, low price
3	Size	small size
4	Height	tall height
5	Color	red color
6	Weight	3 kilograms
7	Age	20 years

Table 1: List of Attributes

Consider the following instances of genitive phrases with multiple instances of attributive genitive modifiers.

(7) a. لمبے قد کی گورے رنگ کی لڑکی
[lambe qad=kii]   [gore rañg=kii] laRkii
tall   height=Gen.F   white color=Gen.F girl.F
'The girl of tall height and white colour'
b. کم قیمت کا چھوٹے سائز کا لیپ ٹاپ
[kam qiimat=kaa] [cHoTe size=kaa] laptop
low price=Gen.M small size=Gen.M laptop.M
'A laptop of low price and small size'

In both (7a) and (7b) the order of genitive modifiers can be alternated without changing the truth-conditional meaning. My claim is that only attributive genitive modifiers can stack together in a flat structure in Urdu. Furthermore, attributive genitive modifiers show a syntactically similar distribution as adjectival modifiers. The instances in (7) can be uttered with adjective modifiers as in (8).

(8) a. لمبی گوری لڑکی
lambii   gorii   laRkii
tall.F.Sg white.F.Sg girl.F.3Sg
'The tall and white girl'
b. سستا چھوٹا لیپ ٹاپ
sastaa   cHoTaa   laptop
cheap.M.Sg small.M.Sg laptop.M.Sg
'The cheaper and smaller laptop'

Like adjectival modifiers (9), the attributive genitive modifiers also modify the head noun (10) and that these cannot modify other genitive phrases. With this argumentation it is clear why example phrases in (4) and (5b) are ungrammatical.

(9) a. علی کا بڑا کمرہ
alii=kaa   baRaa kamrah
Ali=Gen.M big.M room.M.Sg
'Ali's big room'
b. * بڑا علی کا کمرہ
* baRaa alii=kaa   kamrah
big.M. Ali=Gen.M room.M.Sg
'Ali's big room'

(10) a. پینے کا صاف پانی
piine=kaa   saaf paanii
drink.Inf=Gen.M clean water.M.Sg
'Purified drinking-water'
b. ? صاف پینے کا پانی
? saaf piine=kaa   paanii
clean drink.Inf=Gen.M water.M.Sg
'Purified drinking-water'

In (9b) the adjectival modifier *baRaa* 'big' is not modifying the head noun *kamrah* 'room'. We cannot suppose that this adjective is modifying the possessor noun because in that case it should have been in oblique form to agree with *Ali*, which is oblique given that it is hosting a genitive *kaa* on the possessor noun phrase. As the adjective cannot modify the genitive phrase *alii=kaa kamrah* 'Ali's room', the whole phrase becomes ungrammatical. The phrase in (10b) can only be grammatical if the phrase *piine=kaa paanii* 'drinking-water' is considered as a unit. As in English the phrase *every men's room* is acceptable

because *men's room* is considered as a noun-noun compound involving the possessive morpheme and *every* takes *men's room* as a unit for its complement [8].

Sometimes ambiguity is generated as to whether the genitive attributive modifier before the material genitive modifier is for **the material of the head noun** or **the head noun** itself (11a). If the material genitive modifier is placed before any other genitive attributive modifier (11b) then no such ambiguity is generated.

(11) a. سرخ رنگ کی لکڑی کی میز
  surx rañg=kii lakRii=kii mez
  red color=Gen.F wood=Gen.F table.F.Sg
  'The table made of red wood' OR
  'The red table made of wood'
 b. لکڑی کی سرخ رنگ کی میز
  lakRii=kii surx rañg=kii mez
  wood=Gen.F red color=Gen.F table.F.Sg
  'The red table made of wood'

When both adjectives and attributive genitive modifiers are present in noun phrases then attributive genitive modifiers are placed near the head noun after the adjectives (12).

(12) ندا کا لال رنگ کا خوبصورت لباس
  nidaa=kaa laal rañg=kaa xuub-suurat libaas
  Nida=gen red color=Gen beautiful suit
  'Nida's beautiful red suit'

(13) a. کم قیمت کا لیپ ٹاپ
  kam qiimat=kaa laptop
  low price=Gen laptop
  'A laptop of low price'
 b. پندرہ سو روپے کا لیپ ٹاپ
  pandrah sao ropai=kaa laptop
  fifteen hundred rupee=Gen laptop
  'A laptop of fifteen hundred rupees'

(14) a. قیمت کا علم
  qiimat=kaa ilm
  price=Gen knowledge
  'Knowledge of the price'
 b. سو روپے کی قیمت
  sao ropai=kii qiimat
  hundred rupee=Gen price
  'Price of one hundred rupees'

If a genitive marker is added to some specified attribute (13a) or some value of attribute (13b), in both cases it will be considered as an attributive genitive modifier, provided the modified noun is not an abstract one. In (14a) and (14b) the modified nouns are abstract

and therefore modifiers in such cases are not attributive genitive modifiers. The *is-a* relation is expressed in (14b).

The *part-whole* relation with a genitive construction is expressed by marking the *whole* with the genitive marker but the other way round is also possible in Urdu. In the later case the *part* before hosting the genitive marker is modified by some adjective/quantifier and it acts like attributive genitive modifiers (15a-b).

(15) a. ایک ٹانگ کا مرغا
  ek taañg=kaa murQaa
  one leg=Gen.M rooster.M
  'The rooster of one leg'
 b. پیلے رنگ کا دو پروں کا یہ پنکھا
  piile rañg=kaa do paroñ=kaa yih pañkHaa
  yellow colour=Gen two wing=Gen this fan
  'This fan of yellow colour and of two wings'

So far, in this section, multiple instances of genitive modifiers have been explored and the analogy of attributive genitive modifiers with adjectives was described. Multiple genitive arguments of nouns are discussed in the next section.

3. Nominals and Genitive Arguments

Some nouns like *brother*, *child*, *enemy*, *edge*, etc., are supposed inherently relational [9], taking the genitive arguments in English and many other languages but the clearest cases of arguments in noun phrases are found in some nominalization. The relationship between nouns and verbs was established first by Chomsky in 1970 [10], when he showed that verbs and nouns seem to share complement-taking properties (16).

(16) a. The enemy destroyed the city.
 b. The enemy's destruction of the city.

One basic difference between the argument structure of verbs and nouns is that verbs can take bare NPs as their arguments but the nouns cannot take bare NPs as their arguments. First it was believed that nouns take arguments only optionally [11], [12]. Later it was shown [13] by Grimshaw that many nouns have two senses or interpretations. In one sense they denote complex events and take arguments obligatorily and in another sense they denote simple events and do not necessarily take arguments. In the first sense they are called process nominals or derived nominals [14] and in the later sense they are called result nominals. Later

in this section, it will be examined whether this distinction also exists in Urdu or not.

In Urdu, infinitives are used to construct clauses and are also used as nominals. Butt [15] has debated whether infinitive clauses in Urdu are equivalent to finite clauses or whether they are nominalizations or gerunds. Bhatt [16] proposed that infinitives can be projected without a subject but Davison [17] recommended only full clause structure for Urdu infinitives. She provided evidence for the presence of projected syntactic subject in infinitive clauses, even if it is not pronounced.

In this paper Urdu infinitives as nominals will be explored as to what types of genitive arguments they can take. Consider the example phrases of infinitival nominals in (17).

(17) a. ایندھن کا جَلنا
    iiñdHan=kaa jalnaa
    fuel=Gen.M burn.Inf
    'burning of fuel'

b. مریض کا کھاںسنا
    mariiz=kaa   kHaañsnaa
    patient=Gen.M cough.Inf
    'Coughing of the patient'

c. ندا کا دیکھنا
    nidaa=kaa   dekHnaa
    Nida=Gen.M see.Inf
    'Seeing of Nida/ Seeing by Nida'

d. علی کا ندا کو دیکھنا
    alii=kaa   nidaa=ko dekHnaa
    Ali=Gen.M Nida=Acc see.Inf
    'Seeing of Nida by Ali'

For both unaccusative intransitive verbs (17a) and unergative intransitive verbs (17b), the subject argument (the theme in the first case and the agent in the later case) of the nominal is marked genitive. The question is which argument of the transitive verb *dekHnaa* 'see' is marked by genitive marker in (17c). Is it subject or object? It is assumed that it can be either in Urdu. If only one argument of the infinitival nominal of a transitive verb is mentioned in Urdu then it can be either its internal argument or its external argument.

Lebaux [18], however, explained that if the subject of nominal derived from transitive verb is present then object must obligatorily be there for the noun phrase to be grammatical. Grimshaw showed that obligatory arguments are taken by nominals only when these are action nominals and it could also be the case that the same nominal behaves in both senses. With this explanation the nominal in (17c) will be considered as a result nominal. It is observed that with infinitives only one argument is marked genitive. In case full argument structure is realized, the subject is marked genitive and the object is marked nominative or accusative. This is illustrated in (18)-(19).

(18) a. ندا کا بیچنا
    nidaa=kaa   becnaa
    Nida=Gen.M sell.Inf
    'Selling by Nida/ Selling of Nida'

b. کھلونوں کا بیچنا
    kHilonoñ=kaa becnaa
    toy.Pl=Gen.M sell.Inf
    'Selling of toys'

c. ندا کا کھلونے/ کھلونوں کو بیچنا
    nidaa=kaa   kHilone/kHilonoñ=ko becnaa
    Nida=Gen.M toy.Pl/toy.Pl.Obl=Acc sell.Inf
    'Selling of toys by Nida'

d. ندا کا بچوں کو کھلونے بیچنا
    nidaa=kaa   bacoñ=ko   kHilone becnaa
    Nida=Gen.M child.Pl=Dat toy.Pl sell.Inf
    'Selling of toys by Nida to the children'

(19) a. ایک خدا کا ماننا
    ek xudaa=kaa maan-naa
    one God=Gen believe.Inf
    'Believing in one God'

b. قرآن کا پڑھنا
    quran=kaa paRhnaa
    Quran=Gen read.Inf
    'Reading of Quran'

In (18) the infinitive of a transitive verb *becnaa* 'sell' is given with its arguments. The subject reading of genitive modifier in (18a) and object reading in (18b) both are okay. In (18c-d) both object and subject are mentioned and only the subject is marked genitive. The instances in (19) are frequent expressions in Urdu web corpora where only the object reading is construed. In case of only single genitive argument of the infinitive, most of the times object reading is meaningful.

Persian infinitives are also used as nominals and they too can take either subject or object, but not both with the ezafe construction [19]. In Urdu, however, not only some arguments of infinitive nominals are marked with the genitive, but also arguments of participial adjectives and some subordinate clauses are marked genitive.

(20) a. دودھ کا جلا ہوا
    duudH=kaa jalaa   huaa
    milk=Gen.M burn.Perf.M be.Perf.M
    'One, who has been burnt of milk'

b. سانپ کا ڈسا ہوا
saañp=kaa dasaa huaa
snake=Gen.M bite.Perf.M be.Perf.M
'One, who has been bitten of snake'

(21) a. پولیس کے ہوتے ہوئے
police=ke hote hue
police=Gen.Obl be.Imperf be.Perf
'In the presence of police, …'

b. استاد کے آتے ہی
ustaad=ke aate hii
teacher=Gen.Obl come.Imperf Emph.
'With the coming of teacher, …'

(22) a. لاڈ کا پلا ہوا
laad=kaa palaa huaa
love=Gen.M bring-up.Perf.M be.Perf.M
'One, who has been brought up with love'

b. رات کا بھولا ہوا
raat=kaa bHuulaa huaa
night=Gen.M forget.Perf .M be.Perf.M
'One, who has forgotten at night'

In (20) the subjects of participle adjectives are marked with the genitive. In (21) the subjects of participles are marked genitive and here these participles are acting like clauses. In (22) genitive marked elements give adverbial meanings with derived adjectival participles.

3.1. Nominals other than Infinitives with Genitive Marked Arguments

In Urdu many nouns other than infinitves are derived from verbal roots and take genitive arguments. Some nouns are derived from verbal roots of Urdu itself and some are derived from verbal roots of other languages like Arabic and Persian. These nouns can be divided into two classes. The nouns in one class take only one genitive marked argument and the nouns in other class can take two genitive marked arguments. Some instances of nouns from the former class are given in (23)-(24).

(23) a. ٹرین کی روانگی
Train=kii ravaangii
Train=Gen departure
'departure of train'

b. ٹرین کی اسٹیشن سے روانگی
Train=kii station=se ravaangii
Train=Gen station=Abl departure
'departure of train from the station'

(24) a. سیلاب کی تباہی
sailaab=kii tabaahii
flood=Gen.F destruction.F
'Destruction due to flood'

b. فصلوں کی تباہی
fasloñ=kii tabaahii
crop.Pl=Gen.F destruction.F
'Destruction of crops'

c. انسان کی تباہی
insaan=kii tabaahii
man=Gen.F destruction.F
'Destruction of man' OR
'Destruction by man'

d. انسان کی فصلوں کی تباہی
insaan=kii fasloñ=kii tabaahii
man=Gen.F crop.Pl=Gen.F destruction.F
* 'Destruction of crops by man' OR
'Destruction of crops of a man'

e. * سیلاب کی فصلوں کی تباہی
* sialaab=kii fasloñ=kii tabaahii
flood=Gen.F crop.Pl=Gen.F destruction
'Destruction of crops due to flood'

f. سیلاب سے فصلوں کی تباہی
sailaab=se fasloñ=kii tabaahii
flood=Abl crop.Pl=Gen.M destruction
'Destruction of crops due to flood'

In (23) *ravaangii* 'departure' is a noun derived form the intransitive verb and has two alternate subcategorization frames. In both cases it takes genitive marked subject. All nouns of intransitive nature have their subject as genitive marked. The noun *tabaahii* 'destruction' is of transitive nature and can take either a genitive marked subject or a genitive marked object (24a-c) but not both of them (24d-e) are marked for genitive case. In (24f) the subject of the nominal is marked by the ablative marker *se*. Other nominals in Urdu which fall in this class are for example *pitaaii* 'beating', *dHulaaii* 'washing', *pisaaii* 'crushing', *muaaina* 'examination'.

There are some nouns that can take only a genitive marked object, for example, the nominal *bacaao* 'safety' derived from the verb *bacaanaa* 'save'. The noun *intixaab* 'selection' usually takes a genitive object. However, it can also act as result nominal where it refers to the result of the selection process as in English.

(25) a. صدر کا انتخاب
sadr=kaa intixaab
president=Gen selection
'Selection of the president'

b. علی کا انتخاب
alii=kaa intixaab
Ali=Gen selection
'Selection made by Ali'

c. یہ خوبصورت شعر علی کا انتخاب ہے
   yih xuub-suurat Ser alii=kaa   intixaab hai
   this beautiful   verse Ali=Gen selection be
   'This beautiful verse is selection of Ali'

In (25b) the noun *intixaab* 'selection' refers to some result of the process which is evidenced in (25c). Because event or process nominals cannot be used predicatively as showed by Grimshaw [13], the instance of noun *intixaab* 'selection' in (25c) is a result nominal which is modified by a genitive modifier.

The second class of nominals in Urdu is typical in that both subject and object/theme are marked by genitive markers. In Persian there is not a single nominal in which both subject and object are licensed by *ezafe* construction. In English too, both subject and object of any noun can not be prenominal genitives. It is a special characteristics of Urdu and some other Indo-Aryan languages that these have some nominals in which both subject and object/theme both are marked genitive at the same time. The noun *gHeraao* 'circumventing' derived from the verb *gHernaa* 'circumvent' is one example of such nouns.

(26) a. نوجوانوں کا تھانے کا گھیراؤ
    naojavaanoñ=kaa tHaane=kaa   gHeraao
    youngster.Pl=Gen   police-station=Gen circumventing
    'Circumventing of police-station by youngsters'
  b. صدر کا الیکشن کرانے کا اعلان
    sadr=kaa   election karaane=kaa elaan
    president=Gen election do.Inf=Gen announcement
    'Announcement made by president to conduct elections'
  c. عوام کا صدر کے اعلان کا خیرمقدم
    avaam=kaa sadr=ke elaan=kaa   xair-maqdam
    people=Gen president=Gen announcement=Gen welcome
    'Welcome of people for the announcement of president'

For each head noun in noun phrases of (26), there are two arguments and these are both marked genitive.

4. LFG Implementation

LFG's modular framework represents the syntax with two basic representations. The c-(onstituent) structure encodes the basic constituency structure and linear hierarchy of the elements and the f-(unctional) structure models grammatical relations, functional information and other dependencies. In Urdu grammar development [20] genitive markers are dealt in syntax. These clitics have their own terminal node to represent the head of a case phrase.

The genitive marker agrees in gender, number and case with the head noun. This agreement is dealt with at f-structure via feature unification. The genitive

phrases with a single instance of genitive marked element work well. With multiple instances of genitive elements the complexity increases. Consider (27):

(27) a. ابرہا کا ہاتھیوں کا لشکر
    abrahaa=kaa   haatHiyoñ=kaa laSkar
    Abraha=Gen.Sg elephant.Pl=Gen army.M
    'Abrah's army of elephants'
  b. ابرہا کے ہاتھیوں کا لشکر
    abrahaa=ke   haatHiyoñ=kaa laSkar
    Abraha=Gen.Pl elephant.Pl=Gen army.M
    'The army of Abraha's elephants'
  c. ابرہا کے ہاتھیوں کے لشکر
    abrahaa=ke haatHiyoñ=ke   laSkar
    Abraha=Gen elephant.Pl=Gen army.Pl
    'The armies of Abraha's elephants' OR
    'Abraha's armies of elephants'

With out any restriction the following three bracketing structures for (27a) can be assumed.

   (i) [abrahaa=kaa [haatHiyoñ=kaa laSkar]]
   (ii) [abrahaa=kaa haatHiyoñ=kaa laSkar]
   (iii) [[abrahaa=kaa haatHiyoñ]=kaa laSkar]

Due to non-agreement of number with the head noun the bracketing structure in (iii) is ruled out via feature unification. Structural ambiguity increases when a genitive phrase with multiple instances of genitive elements hosts a case marker, say for example an ergative marker. When a case marker is added to any instance of (27a-b) both result into the similar surface structure as in (27c).

To rule out the bracketing structure (ii) above, it is proposed to typify different genitive case phrases in the grammar, like attributive genitive case phrase, relational genitive case phrase, and so. When the two case phrases in (ii) will not be recognized as attributive case phrase, then it will be rejected and only the first one will be recognized for (27a) that seems plausible.

Likewise different nominals taking genitive arguments are proposed to be categorized according to the number and type of genitive arguments they take. The lexicon with full subcategorization information of nouns will help to correctly parse the noun phrases in Urdu and the coverage of the parser will be increased.

5. Conclusion

In this article noun phrases of Urdu with multiple instances of genitive elements have been analyzed. The flat and hierarchical structures of such phrases are explored. It is shown that attributive genitive modifiers

behave like adjective modifiers in the syntax and can stack together at the same level and it is proposed to deal such elements separate to other genitive elements. The hierarchical structure of noun phrases with genitive modifiers, however, needs to be worked out further as to disambiguate depth of hierarchy in either direction based on features of the participants. It will help making grammar robust and increasing the coverage. The classification of nominals based on their number and type of genitive arguments is proposed to provide an enriched lexicon to the parser of the grammar.

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