A Computational Classification of Urdu Dynamic Copula Verb

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ABSTRACT
In this paper, a lexical functional grammar for an automatic classification of Urdu copula verb हौ (be/become) is presented according to linguistic theories. A test suite of sentences containing almost all different conjugation forms of copula verb is extracted from a raw corpus. It is tried to keep only the cases of copular construction because the copula verb हौ is very much dynamic in nature of function. The respective syntactic and functional structures of different cases of copular construction are presented, through which the lexical, syntactical and functional information required by copula verb is explored. The explorations made computationally are then compared with the existing linguistic theories as a proof of evaluation. It is an attempt to classify the state-of-the-art dynamic behavior of Urdu copula verb.

General Terms:
Copula Verbs, Subject, Predicate Link, Lexical Functional Grammar

Keywords:
Computational classification, Urdu copula verb, Complex predicate, Infinitive, Non-aspectual, C & F structure

1. INTRODUCTION
Verb classification is an important issue in computational linguistics (CL) to understand the role of verbs in semantics. This concept is involved in many tasks like semantic parsing, semantic search, information extraction, etc. The functional structure depends on the verb categories and an automatic predicate argument identification is not possible without having information of verbs. Due to this, VerbNet [26] and FrameNet [4] are being used extensively in extraction of predicate argument structure. These resources like VerbNet and FrameNet are not used to solve the related problem mentioned above, rather an own test suite for the Urdu language is built because Urdu is an under resource language. A lexical functional grammar (LFG) is coded with candidate lexical items using a XLE parser environment that provides a framework to exploit the syntactical and semantical information in it. After getting predicate argument structures, these are compared with existing linguistic theories for validation along with some novel ideas for the said copula verb हौ (be/become) of Urdu language. This whole work is exercised to build a classification/categorization for the dynamic copula verb. A similar kind of work was performed for extraction of different types of modal verbs for Urdu language by Abbas et. al. in [3]. For development of a state-of-the-art computational classification of copula verb, a limited test suite of 200 sentences is collected. The test suite is completely covered the lexicon of the grammar developed. The experiments are carried out with different types of sentences having copula verb. The parsed sentences obtained after experimentation are compared with existing theories and information gathered from native speakers. The copula verb can express the functions of copular predication, static vs dynamic expression, tense auxiliary and as a light verb [7, 6] in verb complex predicates [5]. The examples of these functional expressions are divided into different conjugation forms which are nineteen in number. These forms contained infinitives, non-aspectual and aspectual [10] ones. These different conjugation forms are given in table 1. Through this computational study of copula verb, eleven different predicate argument structures are classified which are discussed along with their syntactic and functional requirement in section 3. Our experimental methodology is illustrated in section 2 and finally, the conclusion and the future work is presented in section 4.

2. EXPERIMENTAL METHODOLOGY
Relevant linguistic theories and the native knowledge of Urdu language are the two measures considered to build a classifier in the form of a LFG. These theories are discussed with proposed classified predicate argument structures in section 3. This classified LFG is coded in an IDE (integrated development environment) of XLE parser2. The labeling of predicates is adopted with minor changes from an annotation scheme of treebanks [1, 2] existed for Urdu. The test suite sentences are parsed on the classifier and the predicate argument structures of copula verb are identified which are discussed in section 3. The respective c (syntactic structure) and f (functional structure) structures concluded by the classifier along with their example sentences are also given in that section.

1This parser was developed by Xerox Palo Alto Research Center, USA.

2http://www.parc.com/
Table 1. Conjugation forms of verb hO

<table>
<thead>
<tr>
<th>Conjugation forms</th>
<th>Feature description</th>
</tr>
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<tbody>
<tr>
<td>hO-mA</td>
<td>be.Inf.M.Sg</td>
</tr>
<tr>
<td>hO-nE</td>
<td>be.Inf.M.Pl</td>
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<tr>
<td>hO-nI</td>
<td>be.Inf.F</td>
</tr>
<tr>
<td>tHA</td>
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<tr>
<td>tHE</td>
<td>be.M.3Pl.Past</td>
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<td>tHI</td>
<td>be.F.3Sg.Past</td>
</tr>
<tr>
<td>tHIN</td>
<td>be.F.3Pl.Past</td>
</tr>
<tr>
<td>hE</td>
<td>be.2/3Sg.Pres</td>
</tr>
<tr>
<td>hEN</td>
<td>be.Pl.Pres</td>
</tr>
<tr>
<td>hO</td>
<td>be.2.Pres</td>
</tr>
<tr>
<td>hON</td>
<td>be.1Sg.Pres</td>
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<tr>
<td>hUI</td>
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<td>hOTN</td>
<td>be.Impert.F.Pl</td>
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</tbody>
</table>

3. CLASSIFICATION OF COPULA VERB

The design of the copula verb is divided according to their well known conjugation forms as depicted in table 1, and it is tried to embed some more argument structures to example sentences in the test suite. The use of the copula verb is divided into six different categories. Among these categories, three are the major ones e.g. infinitive, non-aspectual and aspectual. The other three includes the use of copula verb as light verb, participle and miscellaneous. The copular construction is divided according to enrichment of argument structures and the individual cases of these categories as listed as follows:

3.1 Infinitive Copula

The infinitive copula honA (to be/ to become) has three different conjugation forms in Urdu, which are honA (sg, masc), honE (pl, masc) and honI (sg, fem). In modern Urdu, the last conjugation form honI is also being in use for plural number of feminine gender. The two example sentences with conjugation form honA and honE are presented in example 1 and 2, and their respective analysis of c & f structure are given in figure 1 and 2 respectively.

(1) mujHE lambA honA
l.masc+fem.sg=Dat long.masc.sg be.cop.masc.sg
hE. be.pres.masc+fem.sg.
‘I have to become long.’

Both the examples 1 and 2 are the case of dynamic readings. In example 1, the subject (SUB) of the sentence mujHE has a dative case (DAT) of personal pronoun (PPERS). The predlink (PRD) of the sentence lambA is an adjective (ADJ). In these conjugation forms of infinitive copula verb, an adjective phrase (ADJP) is considered only for discussion here. The other phrases like noun phrase with nominative case (NPnom), spatial or temporal postpositional phrase (PPspst or PPtmp), adverbial phrase (ADVP), etc are also possible which will be discussed in upcoming sentences in this paper. The subject NPdat has no effect on number and gender agreement except the default masculine singular form of infinitive copula due to dative case as depicted in figure 1. In literary Urdu, example 1 can be spoken by a feminine gender and then it would be like this as mujHE lambA honE. Even the sentence in example 2 is fairly precise and normal in spoken by a dative SUB having feminine gender, but again there is no any effect of adjectival PRD’s number and gender on default agreement of infinitive copula. If the PRD has an oblique case, then the agreement of infinitive copula remain in default state.

(2) un=kE bAl lambE
Their.masc+fem.pl=POSS hair.masc.pl long.masc.pl
honE be.hEN.
be.cop.masc.pl be.pres.masc+fem.pl.
‘Their hairs have to become long.’

In example 2 the situation is different. Due to nominative case (NOM) of SUB, the agreement of SUB bAl applies on PRD lambE, VCOP honE and tense auxiliary (V AUX) hEN simultaneously as can be seen in c and f structure of figure 2. However, in case of feminine gender of SUB, two conventions of infinitive copula are being ruled in the native society. First is with honIN (pl,fem) hEN (pl,masc+fem) and the second is with hon (sg+pl, fem) hEN (pl, masc+fem). Both are considered precise and accurate. The possible rule for an infinitive copula having various options of agreement is given in appendix A. All the feature structure values are common except window, which means the lexical items can be used before and after the predicate of a sentence.

3.2 Non Aspectual Copula

Non aspectual copular construction is divided into the following categories.

3.2.1 Existential Copula. The existential copular constructions are those in which the verb hO would be used as main verb with existential reading. All tense form e.g. present, past and future are possible in existential constructions. In these copular constructions, only the SUB is the argument of the verb that agrees and all other things are modifiers e.g. NPmod, PPmod, ADVP, etc. The modifier and an adverb can be temporal, spatial, etc. The grammar is checked with or without modifiers and a sentence with modifier is presented here in example 3.

(3) kal a2Id hE. Tomorrow.festival.fem.sg be.cop.pres.masc+fem.sg
‘It is Eid(festival) tomorrow.’

In Urdu, the present tense can be used for tomorrow’s event. If someone ask a question like What is the day tomorrow? , then answer of this is It is Eid(festival) tomorrow. The future tense hO gA (will/shall be) can also be used but then the meaning would be changed into may/may not. Here, in this example when a present tense will be used then the meaning of confirmation is there. The respective c and f structure of example sentence is given in figure 3.

In this construction, a noun phrase NPmod is acting like a modifier MODF and its type is temporal noun as can be seen in f-structure. Being concise in discussion, a rule with different possibilities is given in appendix B. Since the existential copular construction is the case of intransitive use of verb, so the rule is very simple in its nature and there is no any existence of PRD in this construction. Due to this, it is still a hot issue that in these type of constructions, the verb hO is copula or not. However, only those sentences are selected which are the true cases of existential copular construction.
3.2.2 Identification & Classification Copula. The meaning of copular construction is diverse and complex as narrated by Declerck in [16] and Hengeveld in [19]. Similarly, Curnow in [14] divided the identification and classification meaning of copular con-
structure in four ways which are verbal copula, particle copula, zero copula and inflectional copula. In case of Urdu, the verbal copula is used in meaning of identification and classification as shown in example 4 and 5 respectively.

(4) woh larKAh mErAb bHAI
That boy.masc.sg my.masc.sg=POSS brother.masc.sg
be.cop.pres.masc+fem.sg
'That boy is my brother.'

(5) ye kItAb hE.
This book.fem.sg be.cop.pres.fem+masc.sg
'This is a book.'

In Raza’s thesis [25], it is claimed on the basis of Declerck’s theory [10] that the verbal copula in Urdu can have the meaning of specification and predication e.g. in example 4 ‘that boy’ is specified by ‘my brother’ and in example 5 the book is predicated to ‘this’. Further analysis of identification and classification is elaborated in figure 3. Only example 5 is presented because the other has the same concept. In this example, the SUB larKAh has no case marker, hence agrees with the copula verb hE in gender and number. Modifiers can exist at any position before the copula verb. These modifiers can be spatial, instrumental, temporal etc and its feature structure with almost all possibilities is very much similar to appendix A.

3.2.3 Attributive Copula. Attributive copula are those who contribute some property to subject of a sentence. These attributes are normally adjectives and it can also be a possessive. Adjectives attributes are exactly similar to example 2 if infinitive copula does not exist in that sentence. The possessive attribution gives a meaning of ‘of’ like in English and discussed by Raza in [24]. The examples of adjective and possessive attributes are given in example 6 and 7.

(6) mErE bAI lambE
My.masc.pl=POSS hair.masc.sg+pl long.masc.pl
be.cop.pres.masc+fem.pl
'My hairs are long.'

(7) mErI larKkIyAN lambl
My.fem.sg+pl=POSS girls.fem.pl long.fem.sg+pl
be.cop.past.fem.pl
'My girls were long.'

3.2.4 Spatial Copula. As described by Butt et. al. in [8], the location provides a spatial position of an entity and hence it is PRD. Due to free word ordering of Urdu language, this spatial predicate can change its position in the sentence which is not discussed by Butt et. al. However, in doctoral thesis of Raza [25], two postulates have been developed. One is the same as narrated by Butt et. al but the other one is related to position of a spatial predicate if it is moved in the beginning of the sentence and then it is considered to be a modifier MODF and not a PRD. The example of the spatial copula is given in 8.

In example 6 ‘long’ is attributed to ‘my hairs’. Similarly, in example 7 ‘long’ is attributed to ‘my girls’ but due to past tense this attribution is not confirmed in present situation that either this attributed property is existed or not. larKkIyAn is the SUB which agrees with the copula verb hIN and the SUB has also an agreement effect on PRD if it is an ADJP. Finally, ‘of sixteen years’ is totally different from adjective case of attribution. Here, it is a possessive attributed property to SUB, which means ‘sixteen years’ are attributed to Nida, which is a SUB that agrees with copula verb. The PRD’s possessive case marker is also in agreement with the SUB. The analysis of examples 4 and 5 are given in their respective c & f structures in figure 5 and 6 respectively.

The analysis of example 4 and 5 is incomplete because it is giving us only one classification of predicate argument structure and not the other one. The PRD in this sentence should be XCOMP-PRD, where the MODF of nominal NOM type after PRD can make the whole PRD as of NOM type e.g. solah sAl kI bacI (a kid of sixteen years), an instrumental modifier can change the whole story e.g. solah sAl ki larKkI Se (from a girl of sixteen years) and similarly a2Umr Se solah sAl ki (of sixteen years by age) and so on. So, we can say that this possessive attribution construction is restrictive as compared to examples 6 and 7. The rule of possibilities for possessive attribution is similar to appendix A and the rule for possessive attribution can be seen in appendix C.

The modifiers can appear at any position in adjectival attribution with no any effect at argument level but if a MODF appears in a possessive attribution, then it can become an argument of the sentence. For example, a MODF of nominal NOM type after PRD can make the whole PRD as of NOM type e.g. solah sAl kI bacI (a kid of sixteen years), an instrumental modifier can change the whole story e.g. solah sAl ki larKkI Se (from a girl of sixteen years) and similarly a2Umr Se solah sAl ki (of sixteen years by age) and so on. So, we can say that this possessive attribution construction is restrictive as compared to examples 6 and 7. The rule of possibilities for possessive attribution is similar to appendix A and the rule for possessive attribution can be seen in appendix C.


3.2.5 Possessive Copula. Spatial case marker can also be used to identify an abstract location and then this abstract location will become the subject of a clause. The case marker par (on) can be used to identify an abstract location of z2mahdArI (responsibility) and bOjH (burden) as in example sentence (11). The case marker mEN (in) can be used to identify an abstract location of some inherent property like mAmTArA (affection) and jurAT (courage) as in example sentence (12).

(9) kItAb mErA=par
Book.fem.3sg=POSST au. on. be.cop.past.fem.sg
'The book was on the table.'

If mEZ par is shifted to the beginning of the sentence, then the readings of the sentence is totally changed and the translation of whole sentence will become like ‘There was a book on the table’ which is the case of an existential copula and it is also encoded in the grammar. The behavior of this existential copula verb is intransitive and a spatial MODF is normally at the position of a subject in an existential copular construction (13). The c & f structures of example (9) are given in figure (7) in which the SUB kItAb agrees with the copula verb tHI in gender and number. The c & f structures of Freeze’s theory are given in figure (8). Both the solutions are incomplete and the only deficiency in this solution is that the PRD should be XCOMP-PRD and then mEZ (table) should be the object of par (on) with the same SUB as discussed in section 3.2.4. The classifier is deficient in this perspective, which will be dealt in future. Spatial ad-positions are also possible in this construction and a sentence is presented in example (10). The treatment of this sentence having a spatial post-positional predicate is same like figure (7) and the agreement between SUB and copula verb is also the same. The possible feature rule for a spatial copular construction is similar to Appendix A. All of the tense forms can be used with this construction without any effect on argument structure.

(10) kItAb mEZ=kE nKlE
Book.fem.3sg table.fem.3sg=SPT.on be.cop.past.fem.sg
'The book was under the table.'

The general reading of both the case markers par and mEN is spatial but these can interpret other readings as well, which can be seen in c & f structures of example (11) in figure (7). The subject ndA has a case marker par and the copula verb agrees with PRD z2mahdArI in number and gender. If SUB and PRD positions are interchanged with each other then SUB becomes PRD and PRD becomes SUB. Therefore, two readings including a possession ‘has’ and a spatial ‘on’ are possible. The sentence can be translated as Nida has the responsibility of education or The responsibility of education is on Nida. Both are semantically correct alternate to each other. The c & f structures of example (12) are not provided here due to limited length of the article.

Fig. 4. The structure analysis of example (9)

Fig. 5. The structure analysis of example (10)
An abstract location can be identified through a spatial case marker (as discussed) and also through dative case marker. A dative case marker [9] can also be used to identify experiencer/SUB having a possessive case marker acts as a subject SUB.

A copula verb also encodes the possession relation 'has/have' of Urdu possessive case markers ka/kI/kE like in English. The example sentences are given in [14] and [15]. According to McGregor [22], a copula verb agrees with unmarked possessives and if it is not present then a default masculine singular form is used. In a sentence, an argument having a possessive case marker acts as a subject SUB.

There is a spatial postposition PAAs (near) used to encode the possession 'has/have' relationship with in the copular construction as discussed in examples [11] and [12]. A nominating a PAAs spatial postposition is considered as the subject of a sentence [22]. McGregor identified genitives kA/kI/kE in the category of permanent possession and PAAs construction in the category of contingent possession in [21]. Similarly, in [23], Pandharipande argued that genitive is used to express emotional attachment or intimacy, while PAAs construction is used to express material possession. Later on, Sebastian Sulger [27] categorized these two constructions as individual level and stage level predication after performing a test given in [13, 17, 20]. The related sentences to this concept of discussion are given in example [16] and [17].

Both of the examples have a PAAs (near) spatial postposition in it. In example [16] the reading is possessive and a making of KPposs is depicted in the c structure of figure [11]. In example [17] the owner of the book is someone else but it is temporarily shifted to another abstract location Nida. Its translation is changed due to a spatial postposition with an argument of a sentence. In example [17] 'My book' is a subject and 'with Ali' is a predicate link which is not displayed here. The possible feature rule with all options is given in
appendix D. The agreement in both examples is with that argument which does not have a case marker. An agreement of a PRD and a VCOP is existed in first sentence and an agreement of a SUB and a VCOP is existed in second sentence.

3.2.6 Tense Auxiliary & Modal Copula. The non aspectual form of verb hO can also be used as a tense auxiliary. The present tense examples are similar to example 1 and 2 given in section 3.1. If the copula verb hO is replaced with some other verb like karnA (to do) then the tense auxiliary will behave as a copula verb. Similarly, after a same modification, if a tense auxiliary is changed to past tense auxiliary like tHA, tHI, tHE, tHIN then it will be the case of copula verb hO with past tense. The case of future is different because it provides two readings. First is a static modal reading and the second is a dynamic reading. When the future tense is used in a sentence then gA, gI, gE, gIN will be the future tense auxiliary and its behavior is not as a copula verb. The copular construction in future is possible but then it requires the verb hO in subjunctive/root form. Similarly, in passive construction, it requires subjunctive form of jA with the verb hO. A sentence having a future tense is given in example 18. The passive construction normally provides a dynamic reading and the other provides a static modal reading. A tense auxiliary is an obligatory source for provision of tense and copular construction except the future tense. The syntactic feature rule is same as in appendix D except an adjective phrase AP is also possible.
Fig. 10. The structure analysis of example 13

CS 1: S:47

'Ali kO buxAr hE'

SUB 3 NOM 4 5 CASE NOM, GEND masc, NUM sg, PERS 3, TYPE proper-noun

PRD 6 CASE NOM, GEND masc, NUM sg, PERS 3, TYPE common-noun

PRED 'kO'

PRED 'hE<[3:kO], [5:buxAr]>'

PRED 'buxAr'

CASE DAT

NPROP:2 CM:4 N:6 VCOMP:9

Ali:1 kO:3 buxAr:5 hE:7

Fig. 11. The structure analysis of example 16

CS 1: S:65

'Ali kE pAs sOnE kI angUTHI hE'

SUB 3 NOM 4 5 CASE NOM, GEND masc, NUM sg, PERS 3, TYPE proper-noun

PRD 6 CASE NOM, GEND masc, NUM sg, PERS 3, TYPE common-noun

PRED 'pAs'

PRED 'kE'

PRED 'sOnE'

PRED 'angUTHI'

PRED 'kI'

CASE POSS, GEND fem

CASE POSS, GEND masc

SPEC possessive-postposition

CASE OBL, GEND masc, NUM sg, PERS 3, TYPE common-noun

CASE OBL, GEND fem, NUM sg, PERS 3, TYPE count-noun

N:8 CM:10 angUTHI:11 hE:13

Ali:1 kE:3 sOnE:7 kI:9

3.3 Aspectual Copula

Aspectual forms of copula verb hO (be/become) can be divided into imperfective and perfective forms as follows.

3.3.1 Imperfective Copula. Imperfective form is used for generic reading and in Urdu imperfective form of verb hO is also used for similar purpose. The example sentences are given in 19 and 20 as follows.

(18) mErE kAm acHE hoN
    My work masc.pl fine masc.pl become cop subjunctive
    gE
    be fut masc.pl

    'My works will become fine.'
Fig. 12. The structure analysis of example [18]

(19) Ali sargOdHA=mEN hotA
Ali.masc.sg sargodha=SPT.in be.cop.imperf.masc.sg hE.
be.pres.masc+fem.sg
'Ali is in Sargodha.'

(20) zIndagI Ek na2mat hotl
Life.fem.sg a blessing.fem.sg be.cop.imperf.fem.sg hE.
be.pres.masc+fem.sg
'Life is a blessing.'

In both of the examples, the imperfective forms of hotA and hotl of verb hO are used to build a generic/habitual relation as Ali lives in Sargodha and Life is a blessing. A common noun in Urdu can be indefinite or specific depending on the context [15]. In example [19] Ali is not a common noun, so it is specific to that person only. However, in example [20] Life is a common noun and it is applied on the whole class of humans and is an indefinite. The c and t structures of example [20] are given in figure [13] and the rest of the sentences are not displayed due to page limit of this article. Here, 'Life's is the SUB of the sentence and 'Blessing' is the PRD of the sentence. In Urdu, if there is no case marker with the SUB, then the verb agrees with the SUB in number and gender.

3.3.2 Perfective Copula. When a perfective form of verb hO is used, then only dynamic reading is possible with the meaning of become/happen. The different perfective forms hUA, hUE, hUI, hUND are possible. Some of the example sentences can be seen in [21] and [22]. The c & t structures of example sentences [21] are displayed in figure [14] and the rest of the sentences are not displayed due to page limit of this article. Since, there is no any case marker nakH/kakH/kOmEn/CE with the SUB, hence the verb agrees with the SUB in number and gender. Same is the case with a sentence given in example [22].

(21) Ali kal bahut xUS. huA.
Ali.masc.sg yesterday much happy be.cop.perf.masc.sg
'Ali became much happy yesterday.'

(22) mErE bAl lambE huE.
My hairs masc.pl long masc.pl be.cop.perf.masc.pl
'My hairs became long.'

The appendix D is the almost syntactic feature rule for this perfective and imperfective form discussed.

4. CONCLUSION

The classifier concludes eleven different classifications of Urdu copula verb hO (be/become) based on linguistic theories and the native knowledge of Urdu speakers. These classifications can be divided into further categories and can be evaluated accordingly. The future work of identification and classification includes a verbal copula, a particle copula, a zero copula and an inflectional copula. The spatial copula can contain the 'part to whole' concept with a new category. The possessive copula classification discussed. A word apnA (own) is also not discussed in section [3.2.5].

The verb hO as a modal is not discussed with some other possible examples. A number of issues regarding copular construction in Urdu are still remaining to explore like the word nahIN (not) in absence of a tense auxiliary and the verb hO as an emphasis on 'being'. Only noun-verb and verb-verb complex predicates are discussed and the test suite of the classifier does not contain any example of adverb-verb complex predicates. The classifier lacks in light verb discussion related to copular construction. However, the classifier implemented is still a state-of-the-art work for a under resource language Urdu and the remaining issues will be attempted soon.

5. REFERENCES


Fig. 13. The structure analysis of example 20

"zIndagI Ek na2mat hotI hE"

Fig. 14. The structure analysis of example 21

"Ali kal bahut xUS huA"
<table>
<thead>
<tr>
<th>S</th>
<th>→ Modifiers</th>
<th>NP/KP</th>
<th>→ Modifiers</th>
<th>ADJP</th>
<th>→ Modifiers</th>
<th>VCMAIN</th>
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<td></td>
<td>( \text{case: nom/da/acc} )</td>
<td></td>
<td>( \text{case: obfl/null} )</td>
<td></td>
<td>( \text{form: } \text{inf} - \text{copula} )</td>
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<tr>
<td>( \text{gender: } G )</td>
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<td>( \text{number: } N )</td>
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<td>( \text{modifiers/specifiers: yes} )</td>
<td></td>
<td>( \text{window: } \text{vcp, vaux} )</td>
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\( S \) \( \rightarrow \) \text{Modifiers} \( \rightarrow \) \text{NP/KP} \( \rightarrow \) \text{Modifiers} \( \rightarrow \) \text{ADJP} \( \rightarrow \) \text{Modifiers} \( \rightarrow \) \text{VCMAIN}
Appendix C

S

form: Attr - copula
gender: G
number: N
Tense: All
window: prog, vaux

$\rightarrow$ Modifiers

NP
case: nom
number: N
gender: G
person: P
type: T
modifiers/specifiers: yes

KP
case: poss
number: N
gender: G
person: P
type: T
modifiers/specifiers: yes

VCMAIN
form: Attr - copula
gender: G
number: N
Tense: All
window: prog, vaux

Appendix D

S

form: Poss - copula
gender: G
number: N
Tense: All

$\rightarrow$ Modifiers

KP/NP
case: poss/nom/dat
number: N
gender: G
person: P
type: T
modifiers/specifiers: yes

Modifiers

case: nom/poss/
number: N
gender: G
person: P
type: T
modifiers/specifiers: yes

VCMAIN
form: Poss - copula
gender: G
number: N
Tense: All