# Aspect in Hindi-Urdu and transition between syntactic domains[*]

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## 1. Introduction

In this paper, we present a unified account of two properties of affixal aspect (perfective/habitual) in Hindi-Urdu/HU: (i) truncation, i.e. the ability of a verb with affixal aspect to stand alone without a tensed auxiliary, and (ii) the ban on affixal aspect in imperatives and simple future clauses.

Generally, a (present/past) tensed clause in HU contains a verb which hosts affixal aspect and a be-auxiliary, which hosts tense morphology, as in (1). However, a clause with a verb that hosts aspectual affixes can occur without the tensed auxiliary, as shown in (2). In this case, we say that the clause is truncated and label this property as truncation.

(1) karan    kayiiN baar    dilli    jaa-taa         hai
    Karan    many    times   Delhi    go-HAB.M.SG     be.PRS.3SG
    'Karan goes to Delhi many times.'

(2) karan    kayiiN baar    dilli    jaa-taa
    Karan    many    times   Delhi    go-HAB.M.SG
    'Karan would go to Delhi many times.'

The second property pertains to the distribution of affixal aspect. While affixal aspect is obligatorily required in tensed clauses; see (3), it cannot occur in imperatives and simple future clauses, as shown in examples (4)-(5).

(3) karan    dilli    jaa-*(taa)       hai
    Karan    Delhi    go-HAB.M.SG      be.PRS.3SG
    'Karan goes to Delhi.'

(4) dilli     jaa-(*taa)-o
    Delhi    go-HAB-IMP.2N[1]
    'Go to Delhi!'

(5) karan    dilli    jaa-(*taa)-e-gaa
    Karan    Delhi    go.HAB-SBJV.3SG-FUT.M.SG
    'Karan will go to Delhi.'

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[1]  2N refers to 2nd person neutral, which is distinct from the 2nd person intimate (2INT) and 2nd person honorific (2H) forms.

Assuming a tri-partition of the clause into a V-domain that corresponds to events, a T-domain that corresponds to situations, and a C-domain that corresponds to propositions (e.g. Ramchand & Svenonius 2014), we claim that affixal aspect in HU encodes a transition from an event description to a situation description with an added requirement that the created situation is unique. Our proposal captures truncation as a definite description of a situation. Adding the assumption that future is non-deterministic helps explain the ban on affixal aspect in imperatives and future clauses and the lack of future-readings with truncation.

The paper is organized as follows: in Section 2, we present the two properties of affixal aspect in detail. Section 3 provides our main proposal. In Section 4, we discuss two apparent counterexamples to our proposal. Section 5 concludes the paper.

## 2. Two properties of affixal aspect in HU
### 2.1 Property I: Truncation
HU has three grammatical aspect markers of which two are affixal and one is non-affixal: (a) Perfective: affixal (*-aa/-yaa*), (b) Habitual: affixal (*-taa*), and (c) Progressive: stand-alone auxiliary (*rah*). In this paper, we focus on the affixal (perfective and habitual) aspectual morphology since only affixal aspect shows both properties under discussion. In a tensed clause in HU, which can be present or past, affixal aspect (habitual/perfective) is hosted on the verb. As shown in (6), the verb 'go' can bear the habitual or perfective affixes. Tense (here, present) is realized on a be-auxiliary.

(6)  a.  karan    kayiiN  baar    dilli    jaa-taa          hai
         Karan    many    times   Delhi   go-HAB.M.SG      be.PRS.3SG
         'Karan goes to Delhi many times.'
     b.  karan    kayiiN  baar    dilli    ga-yaa          hai
         Karan    many    times   Delhi   go-PFV.M.SG be.PRS.3SG
         'Karan has been to Delhi many times.'

In such tensed clauses, the locus of affixes is fixed - aspectual morphology appears on the verb and tense morphology on the be-auxiliary. For instance, the verb cannot host tense morphology, and the be-auxiliary cannot host aspectual affixes.

(7)  *karan        kayiiN  baar    dilli    jaa-taa-ai    ho
      Karan         many    times   Delhi   go-HAB-PRS   be
      Intended: 'Karan goes to Delhi many times.'

(8)  *karan        kayiiN  baar    Delhi    jaa ho-taa-ai
      Karan         many    times   Delhi   go  be-HAB-PRS
      Intended: 'Karan goes to Delhi many times.'

Furthermore, what is crucial is that it is obligatory for the verb to occur with aspectual morphology - omission of aspect marking leads to ungrammaticality, as in (9).

(9)  karan  kayiiN baar    dilli    jaa-*(taa)      hai
     Karan  many   times   Delhi   go-HAB.M.SG  be.PRS.3SG
     'Karan goes to Delhi many times.'

However, the be-auxiliary hosting tense morphology can be omitted. In other words, clauses where the verb bears affixal (perfective or habitual) aspect in HU can be truncated after the aspect-hosting verb, while still yielding a proposition (Bhatt 1997, Davison 2002, Bhatt & Keine 2017 among others). In (10), we see instances of truncated habitual clauses. The habitual verb can occur without a tensed auxiliary when the sentence contains an adverb of quantification, as in (10a). Similarly, a truncated habitual can also occur in a when-clause, as in (10b) (see Bhatt 1997 for more discussion). A tensed clause with a perfective verb can also be truncated – we show a present perfective tensed clause in (11a) and its truncated counterpart in (11b).

(10) a.  karan  kayiiN  baar  dilli  jaa-taa
Karan  many  times  Delhi  go-HAB.M.SG
'Karan would go to Delhi many times.'

  b.  jab  mira  dilli  jaa-tii,  tab  karan  bhii
when  Mira.NOM  Delhi  go-HAB.F.SG  then  Karan.NOM  also
jaa-taa
go-HAB.M.SG
'When Mira would go to Delhi, Karan would too.'

(11) a.  karan  dilli  ga-yaa  hai
Karan  Delhi  go-PFV.M.SG  be.PRS.3SG
'Karan has gone to Delhi.'

  b.  karan  dilli  ga-yaa
Karan  Delhi  go-PFV.M.SG
'Karan went to Delhi.'[2]

There are two characteristics of truncation that are relevant for us: first, truncation can only take place after the verb that hosts affixal aspect. HU is well-known to have compound verbs (CVs), a productive class of verbal structures that consist of a main verb (MV) and a light verb (LV) (see Hook 1973, Butt 2003). The light verb is semantically bleached - it contributes meanings such as inception, completion, benefaction, suddenness, among many others. Consider the following examples. In (12), the verb 'go' is used as the main verb. Contrast this with its use as a light verb in (13) – here, it does not contribute to the main action, which is contributed by the main verb 'come' instead.

(12) karan  kayiiN  baar  dilli  jaa-taa  hai
Karan  many  times  Delhi  go-HAB.M.SG  be.PRS.3SG
'Karan goes to Delhi many times.'

(13) karan  kayiiN  baar  dilli  aa  jaa-taa  hai
Karan  many  times  Delhi  come  go-HAB.M.SG  be.PRS.3SG
'Karan comes to Delhi many times.'

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[2] We employ the simple past in English to translate truncated perfective clauses in HU, in keeping with standard practice among HU linguists (e.g. Bhatt 1997, Davison 2002). However, we are not committed to a uniform grammatical treatment of the truncated perfective in HU and the simple past in English at this stage.

As shown in (13), in the presence of a light verb, it is this light verb (and not the main verb) that hosts aspectual marking in a tensed clause. Tense, per usual, obtains on the be-auxiliary. Crucially, this clause with a compound verb can only be truncated after the aspect-hosting LV, and not after the uninflected MV, (14).

(14) karan    kayiiN baar    dilli        aa        jaa-taa /*aa
    Karan    many    times    Delhi    come    go-HAB.M.SG/ come
    'Karan would come to Delhi many times.'

Thus, as (14) clearly demonstrates, truncation cannot take place lower than the structural position that hosts affixal aspect.

    The second property of truncation corresponds to its temporal interpretation. Not surprisingly, tensed clauses with an overt auxiliary are interpreted as present or past. Truncated clauses lack a be-auxiliary. Regardless, they can only be used to describe a past or present action but not a future action. Consider the truncated habitual in (15a) which is used to describe a past habitual event, as evidenced by the felicitous occurrence of only a past adverbial such as 'last year'. A truncated habitual clause can also describe a present habitual event, but only in the presence of negation, as in (15b). A truncated perfective clause can have both past and present interpretations, regardless of negation. This is shown in (16), which is compatible with both present and past adverbials.

(15) a.   pichhle saal/#aaj-kal       karan   har      hafte    dilli     jaa-taa
        last       year/nowadays Karan  every   week    delhi    go-HAB.M.SG
        'Last year/#nowadays, Karan would go to Delhi every week.'
    b.   aaj-kal/#pichhle saal    karan   har      hafte    dilli    nahiiN   jaa-taa
        nowadays/last    year    Karan   every   week    Delhi   NEG    go-HAB.M.SG
        'Nowadays/#last year, Karan does not go to Delhi every week.'

(16)    karan-ne    picchle    hafte/aaj            ek      kitaab    paRh-ii
    Karan- ERG    last        week/today          one    book     read- PFV.M.SG
    'Karan read a book last week/today.'

Despite the lack of a tensed be-auxiliary, truncated clauses cannot be used to describe a future event. This is shown for a truncated habitual, both with and without negation in (17a) and (17b) – a future adverbial is infelicitous in both sentences. Same facts obtain for a truncated clause with a perfective verb, (18). Note the use of *kal*, which can normally mean either 'yesterday' or 'tomorrow'. In (18), *kal* cannot mean 'tomorrow'.

(17) a.   #agle    saal karan har      hafte    dilli       jaa-taa
        next    year Karan every   week    Delhi   go-HAB.M.SG
        Intended: 'Next year, Karan will go to Delhi every week.'
    b.   #agle    saal karan har      hafte    dilli    nahiiN   jaa-taa
        next    year Karan every   week    Delhi   NEG    go-HAB.M.SG
        Intended: 'Next year, Karan will not go to Delhi every week.'
(18)    karan-ne        kal                    ek      kitaab    paRh-ii
    Karan- ERG    yesterday/#tomorrow one      book    read- PFV.M.SG
    'Karan read a book yesterday/#tomorrow.'

In summary, in HU, a verb with affixal aspect can stand alone without a tensed auxiliary. This stand-alone clause must contain affixal aspect, i.e. it cannot be truncated lower. Moreover, despite the lack of a tensed be-auxiliary, truncated clauses can only be interpreted as past or present but never future.

## 2.2 Property II: Ban in imperatives and simple future clauses
### 2.2.1 General description of the ban
As already seen, aspectual morphology is obligatory on the verb in tensed (and truncated) clauses. However, imperatives and simple future clauses can never host affixal aspectual morphology. The verb in an imperative must host imperative morphology. Consider (19), where the verb bears the imperative morphology for an honorifically neutral addressee, realized as -*o*. Aspectual morphology is banned on the verb.

(19) dilli      jaa-(*taa)-o
     Delhi      go-HAB-IMP.2N
     'Go to Delhi!'

The same pattern is attested in simple future clauses. Future in HU is marked via subjunctive morphology (-*e/Ø*) plus -*gaa*, which has originated from the verb 'go', (20). Again, no aspectual morphology is allowed on the verb.

(20) karan      dilli      jaa-(*taa)-e-gaa
     Karan      Delhi      go.HAB-SBJV.3SG-FUT.M.SG
     'Karan will go to Delhi.'

CVs can also occur in imperatives and future clauses as shown in (21) and (22) respectively. Despite the availability of two verbs, affixal aspect cannot occur in imperatives and simple future clauses with a CV. As shown in (21) and (22), the main verb 'come' must remain bare and the light verb 'go' must host imperative/future morphology alone.

(21) dilli      aa      jaa-(*taa)-o
     Delhi      come      go-HAB-IMP.2N
     'Come to Delhi!'

(22) karan      dilli      aa      jaa-(*taa)-e-gaa
     Karan      Delhi      come      go.HAB-SBJV.3SG-FUT.M.SG
     'Karan will come to Delhi.'

It is important to note that this ban is neither due to the morpho-phonology of the verb nor due to the lexical meaning of an individual aspectual marker. We discuss both these possibilities below and show that accounts based on either of these options are empirically inadequate.

### 2.2.2 Against a purely morpho-phonological explanation
According to a possible morpho-phonological account, there is a restriction on how much inflectional material can combine with a verb in HU. An aspectual affix on the future/imperative verb form exceeds the designated limit of affixes on the verb, leading to the

ban.

Typically, HU allows one affix per verb (e.g. *jaa-naa* 'go-inf'). However, we also have the future form, which contains two affixes (*jaa-e-gaa* 'go-sbjv-fut'). Based on whether we take the maximum number of affixes per verb stem as one or two, we have two lines of argumentation, both of which fail to explain the ban. We first take the future verb as our template and assume that HU verb can allow up to two affixes. Aspectual marking is correctly ruled out in the future since it adds an extra affix (*\*jaa-taa-e-gaa* 'go-hab-sbjv-fut'). However, since imperative morphology uses a single affix, and HU verb can allow up to two affixes, imperatives should allow aspectual affixes. This is not borne out (*\*jaa-taa-o* 'go-hab-imp.2n').

Alternatively, we assume that HU allows only one affix per verb stem and the future morphology is special in that it is grammaticalized as one affix. Under this one affix per verb limit, the ban on aspectual affixes in both future and the imperative for a honorifically neutral addressee is explained since aspect adds an affix to the verb which already has an affix, crossing the designated limit: (*\*jaa-taa-egaa* 'go-hab-fut') and (*\*jaa-taa-o* 'go-hab-imp.2n'). However, consider the immediate imperative for an informal/intimate addressee in (23). The imperative ending in (23) is null, which should allow the realization of affixal aspect. This is not borne out.

(23) dilli     jaa-(\*taa)-Ø
     Delhi   go-HAB-IMP.2INT
     'Go to Delhi!'

Thus, the ban on affixal aspect in imperatives and simple future clauses remains unexplained under a purely morpho-phonological approach.

### 2.2.3 Against a lexical meaning based explanation

Van der Auwera et al. (2009) propose that the meaning (semantics/pragmatics) of individual aspect markers can be a relevant factor determining their incompatibility in imperatives in some languages. For instance, it is well-known that the progressive form of the verb is very rare, if not completely unavailable, in English imperatives.

(24)     \* Be eating food!

This restriction on the marker (*be* V-*ing*) can be made to obtain from its meaning. Taking aspectual morphology to describe the relationship between the salient 'time under discussion'(Topic Time), and the 'time of predication' (Event Time), the progressive marker indicates that TT is contained within the ET, and not the other way around. Since imperatives typically involve an appeal to the hearer to perform the action as a whole and not merely to be engaged in the activity or part of it, the progressive is generally not allowed in imperatives.

There are at least two issues with extending this approach to the ban on affixal aspect in imperatives and simple future clauses in HU. First, this approach is better-suited to linguistic systems that, in general, allow aspectual morphology in imperatives, but may ban a certain aspectual marker due to its meaning. HU, however, bans all aspectual morphology in imperatives. We have already seen the ban on habitual marker in imperatives, as in (19). This ban extends to the perfective marker, as shown in (25).

(25) dilli      jaa-(*yaa)-o
    Delhi    go-PFV-IMP.2N
    'Go to Delhi!'

Secondly, the empirical domain of this approach is restricted to imperatives and does not necessarily generalize to other types of sentences. For instance, while the distribution of the progressive is restricted in English imperatives, it occurs freely in the future, (26). However, the ban on aspectual morphology on the verb in HU extends across imperatives and future clauses.

(26)    John will be eating food later.

Thus, given the ban on all aspectual morphology across not only imperatives but also future clauses in HU, this approach based on the semantic/pragmatic incompatibility of individual aspect markers and imperatives does not suffice for the language.

    In summary, affixal aspect in HU shows two properties: (i) a clause in HU can be truncated after the aspect-hosting verb, and (ii) affixal aspect in HU cannot occur in imperatives and simple future clauses - this ban is neither due to morpho-phonology nor due to the meaning of individual aspect markers.

## 3. Proposal
### 3.1 Generalization
Given the two properties as discussed in the last section, a clear generalization emerges: affixal aspect in HU is incompatible with a future reading.

    See Table 1 - tensed clauses have both aspectual morphology and a be-auxiliary, and cannot be future-oriented. Imperatives and future clauses lack both aspectual morphology and a be-auxiliary, and are future-oriented. Despite lacking a be-auxiliary, truncated clauses pattern with tensed clauses, and cannot be future-oriented.

|   |                      | V-asp | be-tense | Future | Non-future |
|---|----------------------|-------|----------|--------|------------|
| 1 | Tensed clauses       | ✔     | ✔        | ×      | ✔          |
| 2 | Imperatives          | ×     | ×        | ✔      | ×          |
| 3 | Simple future clauses | ×     | ×        | ✔      | ×          |
| 4 | Truncated clauses    | ✔     | ×        | ×      | ✔          |

Table 1: Form and temporal readings across distinct sentence types

Since both tensed and truncated clauses host aspect, while both imperatives and future clauses lack aspect, we claim that it is affixal aspect in HU, which is incompatible with future readings. This generalization allows us to derive (i) the ban on affixal aspect in imperatives and simple future clauses, both of which are future-oriented structures, and (ii) the lack of future readings with truncated structures (once we explain why truncation can only take place at the projection that hosts affixal aspect).

### 3.2 Preliminaries: event descriptions, situation descriptions, propositions
To derive the incompatibility of affixal aspect with future in HU, we assume a system similar

to that in Ramchand and Svenonius (2014). Following Hinzen (2006), Ramchand & Svenonius (2014) say that the role of syntax is to build complex semantic meanings that represent basic (interpretable) concepts. We will be interested in three such concepts: events, situations, and propositions.

Events are represented by atemporal event descriptions which include information about relations between sub-events (causation, resultativity), thematic role manipulations (passives, applicatives), and aktionsart specifications (static, dynamic). Event descriptions correspond to syntactic objects in the VP-zone.

(27)    $[[ \ [_{VP}...verb...] \ ]] = \lambda e.\text{Verb } (e) \wedge ...$

Situations are partial descriptions of the state of affairs (e.g., Barwise and Perry 1983). They are represented by situation descriptions which are elaborations of event descriptions in the sense that they presuppose the existence of eventuality (technically, the eventuality is $\exists$-closed in a situation description). Unlike events, situations have a time and a world parameter. Thus, a situation is the smallest object that can, in principle, be related to the utterance. Situation descriptions correspond to syntactic objects in the TP-zone which in English hosts auxiliaries and root modals.

(28)    $[[ \ [_{TP}...aux...] \ ]] = \lambda s_{t,w}.\text{ Aux } (s_{t,w}) \wedge ...$

In this system, the transition from event descriptions to situation descriptions is achieved by Asp* (heads marked with an asterisk are transition heads). Everything below Asp* is an event description of different complexity, i.e., $\lambda e.P(e)$. Asp* takes an event description as its complement and builds a situation description which encloses that event description and also provides a time and a world parameter. We can think of the situation built by Asp* as a reference situation (on a par with Reichenbach's 'point of reference').

(29)    $\text{Asp*} \rightsquigarrow \lambda Q \lambda s_{t,w} \exists e \ [Q(e) \wedge \text{Asp } (s_{t,w}, e)]$

Asp has a particular meaning depending on the meaning of the aspectual morpheme that is used for transition. Asp can also bring additional requirements on the situation. For instance, for Ramchand & Svenonius (2014), English perfect is realis, so it brings in an additional requirement that the world parameter of the reference situation is set to the actual world $w^c$.

Propositions are enriched situations that include a relationship to the utterance situation $s^c$, which, in turn, establishes relations to contextual information (including speaker, hearer, time of utterance, etc.). Propositions presuppose a situation (technically, via existential closure). The transition from situations to propositions is made possible by Fin*, which, in English, can host information about tense (anchoring the t-parameter of the embedded situation) or epistemic/evidential modality by the realis/irrealis distinction (anchoring the w-parameter), which is reminiscent of Iatridou (2000).

(30)    $\text{Fin*}_{pres} \rightsquigarrow \lambda R \lambda p[p = \text{Assert } (\exists s[R(s) \wedge s_t = s^c_t])]$

(31)    $\text{Fin*}_{irrealis} \rightsquigarrow \lambda R \lambda p[p = \text{Assert } (\exists s[R(s) \wedge s_w \neq s^c_w])]$

A simple abstract structure will look as in (32). In this structure, we see that different semantic objects correspond to different syntactic projections. Going bottom up, we see that a VP corresponding to an event description combines with Asp*. Asp* creates a situation description which encloses the event description. Thus, Asp*P corresponds to a new semantic object - a situation description. The material at the level of TP enriches the situation description. Then, TP combines with Fin*, which creates a proposition out of the situation description. Thus, Fin*P corresponds to a new semantic object – a proposition. (It should be noted here that propositions in Ramchand & Svenonious (2014) are not classical sets of possible worlds, see Ramchand (2018) for more details. This deviation will not affect our proposal.)

(32)

$$\text{Fin*P}$$
$$\lambda p[p = Assert(\exists s, e[P(e) \land Asp(s,e) \land s_{t,w} \, Rel \, s_{t,w}^c])]$$

Fin*
$$\lambda R \lambda p[p = Assert(\exists s[R(s) \land s_{t,w} \, Rel \, s_{t,w}^c])]$$

TP

T
...

Asp*P
$$\lambda s \exists e[P(e) \land Asp(s,e)]$$

Asp*
$$\lambda Q \lambda s \exists e[Q(e) \land Asp(s,e)]$$

VP
$$\lambda e.P(e)$$

V ...

## 3.3 Aspect in HU

Building on the idea of transition heads, we propose that affixal aspect in HU spells out Asp*. That is to say, in addition to their aspectual meanings, affixal aspect in HU performs the transition from event descriptions to situation descriptions. We also propose that in addition to the transition, Asp* in HU encodes a uniqueness presupposition - it is defined only if the situation it creates is a unique situation, see (33). Here and below, we use Asp*$_{hu}$ as shorthand for Pfv*$_{hu}$ and Hab*$_{hu}$. Asp, as before, provides a specific aspectual meaning for perfective or habitual in HU.

(33)    Asp*$_{hu}$ ⤳ $\lambda Q \lambda s_{t,w} \exists e$ [Q(e) $\land$ Asp ($s_{t,w}$, e)]
        undefined unless s is a unique situation

With these preliminaries in place, we are ready to derive truncation and the ban on affixal aspect in future-oriented structures in HU. Let us begin with truncation. Our proposal here is that the status of Asp*$_{hu}$ as a transition head and the uniqueness presupposition derive truncation as a definite description of a situation. Being a transition head is a necessary condition for affixal aspect in HU to participate in truncation since situation descriptions introduce t- and w-parameters and thus, are the smallest object that can be related to contextual information. The uniqueness requirement on Asp*$_{hu}$ is another necessary condition for truncation. Let us suppose that ∃-closure is a mechanism that is always available as a last resort. By ∃-closing a situation description with the uniqueness presupposition, we get a definite
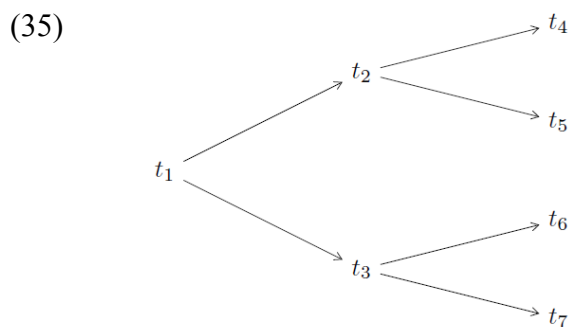
description of the situation. It is plausible to propose that like definite descriptions of individuals can refer, definite descriptions of situations can have their truth determined contextually.

(34)     $\exists!s\exists e\ [Q(e) \wedge Asp\ (s, e)]$

We propose that the above mechanism is what is behind 'truncation' and it is made possible in HU by two factors: (i) affixal aspect in HU encodes the transition from events to situations, and (ii) there is a uniqueness requirement on the created situation. At this point we remain agnostic whether proposition formation is indeed necessary (as for Ramchand & Svenonius 2014), how propositions are formed in case of truncation if they are needed, where the assertive illocutionary force comes from, and many other important questions.

Let us now turn to explaining the ban on aspectual affixes in imperatives and simple future clauses. To explain the ban, we need to make one more assumption. We need to assume that future is non-deterministic. The idea that future is non-deterministic is well studied in tense logic since Prior's and Thomason's works in late 60s and 70s. The idea is based on the intuition that we need to allow for choices among possible futures. This is captured by assuming that time is linearly ordered only with respect to the present and the past. With respect to the future, time 'grows' into a treelike structure, as in (35).

(35)

$$
\begin{array}{c}
t_1 \rightarrow t_2 \rightarrow t_4 \\
\phantom{t_1} \rightarrow t_5 \\
t_1 \rightarrow t_3 \rightarrow t_6 \\
\phantom{t_1} \rightarrow t_7
\end{array}
$$

Now, we argue that the uniqueness requirement on Asp*$_{hu}$ is what is responsible for the ban on affixal aspectual morphology in constructions that describe future-oriented eventualities. To see this, let us begin with noticing that a reference situation s can stand in (at least) six relations to the utterance situation $s^c$, as shown in Table 2. These six relations correspond to different settings of the t- and w-parameters. In Rel$_1$, Rel$_2$, and Rel$_3$, the world index of the reference situation s is the same as the world index of the utterance situation $s^c$. So, we say that the world parameter is not shifted here. The time index in Rel$_1$ is also not shifted, in the sense that the time of the reference situation s overlaps with the time of the utterance situation $s^c$. The time index in Rel$_2$ and Rel$_3$ is backward-shifted and forward-shifted respectively. Rel$_4$, Rel$_5$, Rel$_6$ differ from Rel$_1$, Rel$_2$, Rel$_3$ in having the world index of the reference situation s correspond to any (relevant) world index, which is not necessarily (but not excluding) the world index of the utterance situation $s^c$. In this case, we say that the world parameter is shifted (which should be read as 'possibly shifted' or 'shiftable' as these relations do not necessarily require the reference situation s to be incompatible with the utterance situation $s^c$).

| | w | t | | |
|---|---|---|---|---|
| $Rel_1$ | non-shifted | overlap | one-to-one | Present, actual |
| $Rel_2$ | non-shifted | backward-shifted | one-to-one | Past, actual |
| $Rel_3$ | non-shifted | forward-shifted | one-to-many | Future, actual |
| $Rel_4$ | shifted | overlap | one-to-one | Present, non-actual |
| $Rel_5$ | shifted | backward-shifted | one-to-one | Past, non-actual |
| $Rel_6$ | shifted | forward-shifted | one-to-many | Future, non-actual |

Table 2: Possible $Rel(s, s^c)$

Given our assumption about how time is structured, only four out of six relations in Table 2 are one-to-one relations with respect to the time-parameter, and thus can satisfy the uniqueness presupposition of $Asp^*_{hu}$. These four relations are encoded by (i) present in the actual world ($Rel_1$), (ii) past in the actual world ($Rel_2$), (iii) present epistemic *gaa*-constructions ($Rel_4$), and (iv) past epistemic *gaa*-constructions ($Rel_5$), see (36) - (39). Affixal aspectual morphology is acceptable in all (i) - (iv), as shown for habitual aspect in (40).

(36)    $Pres_{hu} \rightsquigarrow \lambda Q \lambda p \ [p = Assert(\exists s[Q(s) \wedge Rel_1(s, s^c)])]$
    where $Rel_1(s, s^c) = 1$ iff t of s overlaps with t of $s^c \wedge$ w of s = w of $s^c$

(37)    $Past_{hu} \rightsquigarrow \lambda Q \lambda p \ [p = Assert(\exists s[Q(s) \wedge Rel_2(s, s^c)])]$
    where $Rel_2(s, s^c) = 1$ iff t of s precedes t of $s^c \wedge$ w of s = w of $s^c$

(38)    $Epist_{hu} \rightsquigarrow \lambda Q \lambda p \ [p = Assert(\forall s[Acc(s, s^c) \rightarrow Q(s) \wedge Rel_4(s, s^c)])]$
    where $Rel_4(s, s^c) = 1$ iff t of s is a counterpart of $now^c$ and w of s is shifted wrt w of $s^c$

(39)    $Epist_{hu} \rightsquigarrow \lambda Q \lambda p \ [p = Assert(\forall s[Acc(s, s^c) \rightarrow Q(s) \wedge Rel_5(s, s^c)])]$
    where $Rel_5(s, s^c) = 1$ iff t of s is a counterpart of $past^c$ and w of s is shifted wrt w of $s^c$

(40) a.  aaj-kal      karan     roz      kasrat       kar-taa         hai
         nowadays  Karan     daily    exercise    do-HAB.M.SG  be.PRS.3SG
         'Karan exercises daily these days.'
    b.  pichhle saal    karan     roz       kasrat       kar-taa          thaa
         last      year    Karan     daily     exercise     do- HAB.M.SG be.PST.M.SG
         'Karan exercised daily last year.'
    c.  aaj-kal/ pichhle saal karan   roz      kasrat      kar-taa
         nowadays/last    year Karan daily    exercise  do- HAB.M.SG
         ho-Ø-gaa
         be-SBJV.3SG-MOD.M.SG[3]
         'Karan must (epistemic) exercise daily nowadays/ last year.'

With the future-*gaa* (whether we analyze it as modal or not), affixal aspectual morphology is

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[3]  HU employs the same –*gaa* morphology in both simple future and epistemic sentences. For ease of exposition, we gloss the –*gaa* in simple future sentences as FUT and the –*gaa* in epistemic constructions as MOD.

unacceptable because the uniqueness presupposition of Asp*$_{hu}$ cannot be satisfied. (41) and (42) spell out how non-modal (Fut$^1$) and modal (Fut$^2$) simple future can be represented in our system.

(41)  Fut$^1$$_{hu}$ ⤳ λQλp [p = Assert(∃s[Q(s) ∧ Rel$_3$(s, s$^c$) ])]
    where Rel$_3$(s, s$^c$) = 1 iff t of s succeeds t of s$^c$ ∧ w of s = w of s$^c$

(42)  Fut$^2$$_{hu}$ ⤳ λQλp [p = Assert(∀s[Acc (s, s$^c$) → Q (s) ∧ Rel$_6$ (s, s$^c$)])]
    where Rel$_6$ (s, s$^c$) =1 iff t of s is a counterpart of *future*$^c$ and w of s is shifted wrt w of s$^c$

Similarly, for imperatives treated as future-oriented structures, aspectual morphology is out for the same reason. To make a parallel case for imperatives, let us say that the imperative expresses an order to the addressee to bring about the situation developed from the event description in the complement of the imperative operator. This meaning is not fully satisfactory, but it captures the important (for us) characteristic of imperatives, namely, that they are future-oriented, see (43).

(43)  Imp$_{hu}$ ⤳ λQλp[p = Bring − about(∃s[Q(s) ∧ Rel$_3$ (s, s$^c$)])]
    where Rel$_3$(s, s$^c$) = 1 iff t of s succeeds t of s$^c$ ∧ w of s = w of s$^c$

Our system says that affixal aspectual morphology is unavailable with imperatives for the same reason it is unavailable with simple future, namely because the future situation is never unique, and hence the uniqueness presupposition on Asp*$_{hu}$ can be never satisfied.

### 3.4 Shifting

We propose that propositions about future and imperatives are constructed by combining the event description with a shifting operator, standardly taken to be a last-resort solution, see (44). Two things are worth mentioning about (44). First, Sh performs the transition from event descriptions to situation descriptions like Asp*$_{hu}$ but unlike Asp*$_{hu}$ it does not have a uniqueness presupposition which permits Sh to be used in future constructions and imperatives. Second, the Asp$^-$ relation between the event and the situation that encloses it is (most probably) bleached as compared to the perfective and habitual morphology (which we indicate by the superscript $^-$). However, the exact contribution of Asp$^-$ is something that should be further looked at.

(44) Shifting
    For any event description Q, Sh(Q) = λs∃e[Q(e) ∧ Asp$^-$(s, e)]

To sum up, affixal aspect in HU is realised on Asp*$_{hu}$, which has two properties: (i) it is a transition head which marks a transition from event descriptions to situation descriptions, and (ii) it has a uniqueness requirement – the situation it creates must be unique. These two properties of Asp*$_{hu}$ derive truncation as a definite description of a situation. Furthermore, the uniqueness requirement on Asp*$_{hu}$ explains the ban on affixal aspect in constructions that describe future-oriented eventualities, where future is treated as non-deterministic.

## 4. Apparent counterexamples

The ban on aspectual morphology with future-oriented readings in HU has two (to our knowledge) counterexamples. The first counterexample concerns the use of epistemic *gaa*-constructions with completive compound verbs/CCVs.

   With the simple perfective, epistemic *gaa*-constructions only have the past reading. Note the use of *kal* which can normally mean either 'tomorrow' or 'yesterday'. In (45), *kal* can be interpreted only as 'yesterday' but not 'tomorrow'. By contrast, when CCVs are used, epistemic *gaa*-constructions can receive either the past or future interpretation. *Kal* in (46) can be interpreted as 'yesterday' or 'tomorrow'.

(45) karan-ne      kal                  khat      likh-aa          ho-Ø-gaa
     Karan-ERG   yesterday/#tomorrow letter    write-PFV.M.SG   be-SBJV.3SG-MOD.M.SG
     'Karan must have written the letter by yesterday.'
         (Not: 'Karan will have written the letter by tomorrow.')

(46) karan-ne      kal                  khat likh  li-yaa          ho-Ø-gaa
     Karan-ERG   yesterday/tomorrow letter   write take-PFV.M.SG   be-SBJV.3SG-MOD.M.SG
     'Karan must have written the letter by yesterday.' Or: 'Karan will have written the letter
      by tomorrow.'

The example in (46) is problematic for us because the uniqueness presupposition that comes with the perfective morphology on the light verb will not be satisfied in our system. Thus, our system predicts (46) to be ungrammatical, contrary to fact. At the moment, we do not have full understanding of why (46) is grammatical, but we believe this is due to the presence of the CCV structure. This conjecture is supported by the fact that simple epistemic *gaa*-constructions as in (45) cannot have a future reading as predicted by our system.

   The second counterexample is a future-oriented reading of both simple perfective verbs and CCVs in truncated antecedents of indicative conditionals. In HU, either simple future, full past, or full present clauses can be used in the antecedent of an indicative conditional.

(47) a.  agar    karan       kal         davaa       khaa-e-gaa
         if      Karan       tomorrow    medicine    eat-SBJV.3SG-FUT.M.SG
         toh vo thiik    ho jaa-ye-gaa
         thenhe alright  be go-SBJV.3SG-FUT.M.SG
         'If Karan eats the medicine tomorrow, then he will be alright.'          (Future)
     c.  agar   karan-ne  (sone    se     pehle)    davaa       khaa-yii
         if     Karan-ERG sleep.INF from before     medicine    eat-PFV.F.SG
         thii           toh     vo   thiik   ho jaa-ye-gaa
         be.PST.F.SG  then     he   alright  be go-SBJV.3SG-FUT.M.SG
         'If Karan had eaten the medicine before sleeping, then he will be alright.'   (Past)
     c.  agar   karan-ne    davaa      khaa-yii     hai           toh
         if     Karan-ERG   medicine   eat-PFV.F.SG be.PRS.3SG    then
         vo   theek    ho jaa-ye-gaa
         he   alright  be go-SBJV.3SG-FUT.M.SG
         'If Karan has eaten the medicine, then he will be alright.'                (Present)

   d.   agar    karan-ne      davaa        khaa    l-ii             hai

        if      Karan-ERG    medicine    eat     take- PFV.F.SG    be.PRS.3SG

        toh    vo    theek   ho  jaa-ye-gaa

        then   he    alright   be  go-SBJV.3SG-FUT.M.SG

        'If Karan has eaten the medicine, then he will be alright.'        (CCV-Present)

These examples are not problematic for our system as the events marked with perfective morphology in the if-clause are either present or past. When the event in the if-clause is in the future, as in (47a), no affixal aspectual morphology is used.

What is puzzling is that truncated (simple and compound) perfectives in if-clauses receive only the future-oriented interpretation (Bhatt 1997, Sharma 2010). This is illustrated in (48a) for a simple truncated perfective and in (48b) for a truncated CCV. Again note the use of *kal,* which can only mean 'tomorrow' in (48).

(48) a.   agar      karan-ne     kal                      davaa      khaa-yii

         if      Karan-ERG    tomorrow/#yesterday      medicine    eat- PFV.F.SG

         toh    vo    theek       ho  jaa-ye-gaa

         then   he    alright      be  go-SBJV.3SG-FUT.M.SG

         'If Karan eats the medicine tomorrow, then he will be alright.'

     b.   agar   karan-ne       kal                   davaa      khaa    lii

         if      Karan-ERG    tomorrow/#yesterday medicine    eat     take.PFV.F.SG

         toh    vo    theek       ho  jaa-ye-gaa

         then   he    alright   be  go-SBJV.3SG-FUT.M.SG

         'If Karan eats the medicine tomorrow, then he will be alright.'

Above, we presented truncation as a kind of contextual specification of a definite description of a situation. However, the examples in (48) show us that truncated structures do not have to be anchored to the world of utterance provided by the context. They can be anchored to other possible worlds and then receive a future-oriented reading.

To address the second counterexample, we need to understand truncation better. In particular, we need to understand the relationship between t- and w-parameters in case of truncation. There are two immediate possibilities: (i) they are independent of each other and (ii) possible worlds are different paths on the time tree (or different histories). In the second case, for each world (each history), future is deterministic and our second counterexample is no longer problematic.

At this point, we are not ready to provide a full account of what truncation is and what is the relationship between t- and w-parameters in the system. Further research is needed, including thorough empirical investigation. But if our observation that truncated structures are generally incompatible with the future-oriented interpretation is on the right track, accommodating if-clauses as above should not pose an insurmountable theoretical difficulty.

## 5. Conclusion

We made two observations about the distribution of affixal aspect in HU: (i) after affixal aspectual morphology, sentences in HU can be truncated, and (ii) affixal aspectual morphology in HU cannot appear in imperatives and simple future constructions.

    Adopting a system where semantic meaning is built incrementally, we proposed that

affixal aspect in HU encodes a transition from an event description to a situation description with an additional requirement that the created situation is unique. These two conditions helped us to capture truncation as a definite description of a situation. Adding the assumption that future is non-deterministic (i.e., time is forward branching) helped us to explain why future-oriented constructions (imperatives and simple future) cannot host affixal morphology. This is because there is no unique future situation, thus the uniqueness requirement hard-wired into the meaning of affixal aspect can never be satisfied in imperative and simple future clauses.

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