NON-LOCAL INWARD-SENSITIVE ALLOMORPHY IN BENGALI NEGATION[*]

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1.   Introduction

Bengali (Eastern Indic, also known as Bangla) employs two distinct morphemes to negate clauses: *na* and *ni*. The first is the default negation that is added clause-finally to negate non-perfect verbs as in (1) and (2)

(1)   a.   likh-lam
          write-1.PST

          I wrote (it).[1]

     b.   likh-lam   na
          write-1.PST NA

          I didn't write (it).

(2)   a.   likh-ch-i
          write-PROG-1

          I am writing.

     b.   likh-ch-i   na
          write-PROG-1 NA

          I am not writing.

However, perfect verbs negate differently, as shown in (3b):

(3)   a.   sun-e-ch-o
          hear-PRF-AUX-2

          You have heard.

     b.   son-o ni
          hear-2 NI

          You have not heard.[2]

The form of the negative marker is different, and in addition, the auxiliary and perfect marker are absent from negated perfects. Neither negation is compatible with an overt perfect marker.

[1]Bengali is a discourse pro drop language, and so arguments are omitted.

[2]The change in height of the vowel in the root is due to a predictable phonological process of raising triggered by the perfect *-e* suffix. It is not relevant the analysis, and will not be discussed.

(4)   * sun-e-ch-o   na/ni
      hear-PRF-AUX-2 NA/NI

      Intended: You have not heard.

This paper investigates the distribution of two sentential negative markers in Bengali: *na* and *ni*. It argues for two conclusions on the basis of new data from the behaviour of negation in the antecedents of conditionals. Firstly, it argues that a morphological analysis of the distribution of *na* and *ni* is preferable to the existing semantic analysis presented in Ramchand (2004). Secondly, it argues that a morphological theory which takes into account the new data must permit inward-sensitive morphosyntactically conditioned contextual allomorphy in line with Carstairs-McCarthy (2001) and contra Bobaljik (2000). Such an analysis is proposed, and is shown to support the generalisations about locality restrictions on allomorphy identified by Moskal (2015).

The remainder of the paper is structured as follows. Section 2 presents arguments that the distribution of *ni* and *na* is morphologically governed. In order to do so, it first discusses the nature of the *ni* constructions in order to confirm that they are indeed perfects, despite lacking perfect morphology. Then, it presents the new data from antecedents of conditionals, where the 'wrong' negation appears, and discusses the different status of negation in these constructions. Finally, it demonstrates that the existing theory of the distribution of *ni* and *na* in Ramchand (2004), which proposes that they instantiate different negative quantifiers, is incapable of accommodating the data from antecedents of conditionals. Section 3 presents a morphological proposal that is able to account for the data at hand. It discusses the nature of portmanteau, as well as issues pertaining to the directionality and locality of suppletion. Section 4 concludes.

2.   The distribution is morphologically determined

2.1   The nature of *ni* constructions

Given that (3b) looks so different from (3a), going so far as to be missing the perfect morpheme, it is worth confirming that (3b) really is a negative perfect. As per Iatridou et al. (2001), perfects introduce an interval whose right boundary is set by tense, and assert that the event in question occured within said interval.[3] This predicts two expected properties for perfects, which can be used as diagnostics. Firstly, we expect compatibility with various tenses, since the right boundary of the interval is set by tense. Secondly, we except anteriority with respect to tense, since the interval extends backward from the reference time set by tense. Both of these properties are exhibited by the *ni* construction despite the lack of overt tense marking.

(5)   a. ei   gan-ṭa kalke-r   age   sun-i ni
          PROX song-CL yesterday-GEN before hear-1 NI

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[3]Strictly speaking, this is only true of perfects of perfectives, but since Bengali does not have perfects of imperfectives, this is the only behaviour we expect. See Iatridou et al. (2001) for further details.

I had not heard this song before yesterday
⤳ I may have heard it since then

b. ei   gan-ṭa kokkhono age   sun-i ni
   PROX song-CL ever   before hear-1 NI
   I have not heard this song ever before

The compatibility with various temporal adverbs illustrates the compatibility with differing temporal interpretations. Furthermore, the ignorance inference in (5a) shows anteriority, since the state of not having heard need not hold at utterance time, only up to the time set by tense. This illustrates that the construction with *ni* bears the hallmarks of a true negative perfect, despite lacking overt perfect morphology.

2.2 Data from antecedents of conditionals

While most clauses negate with a clause-final morpheme (either *ni* or *na*), negation is preverbal in the antecedents of conditionals, infinitives, participials, gerunds, and subjunctives (Dasgupta, 1996). Example (6) illustrates this with an antecedent of a condtional.

(6) jodi {na} sobji   {na} kha-o, …
     if   {NA} vegetables {NA} eat-2, …
     If you do not eat your vegetables, …

Both Simpson and Syed (2014) and Ramchand (2014) attribute the different positions of negation to some notion of 'finiteness'. However, as Biswas (2014) notes, verbs in the antecedents of conditionals license nominative subjects and have agreement, so this notion of finiteness cannot be the one canonically thought of as being housed in T and relevant for case marking and agreement. Ramchand (2014) assumes this is finiteness in the sense of Adger (2007), in that is marks whether the speech event is anaphorically or deictically linked to the context of the utterance. I follow this view for concreteness, however the crucial component of the analysis will only be that some featural specification create a natural class of clause types that require pre-verbal negation, distinct from those that require clause-final negation. The mechanism by which the position of negation varies is discussed in section 3.1, however, the level of detail therein is minimal as it is not the focus of the paper.

Given that the negation for perfects in assertions is *ni*, we might expect it with nonfinite perfects as well. However, in reality pre-verbal negation is obligatorily realised as *na*.

(7) a.   jodi chata   ni-te   na bhul-e   ch-e,   …
         if   umbrella take-INF NA forget-PRF PROG-3, …
         If they have not forgotten to take an umbrella, …

    b. * jodi chata   ni-te   ni bhol-e,   …
         if   umbrella take-INF NI forget-3, …
         Intended: Same as (7a)

While ideally this test should be replicated with the other contexts which support pre-verbal negation, a severe confound prevents us from testing this. Other than antecedents of conditions, perfects in general are not permitted in the other constructions which normally require pre-verbal negation. Dasgupta (1996) discusses two possible reasons why this restriction may exist. One reason is that the perfect head in Bengali is located in a position that is simply not present with the non-agreeing, non-case assigning constructions that require pre-verbal negation. The other possibility is that the auxiliary required to construct affirmative perfects in all cases *-ch-* is highly defective, and cannot be present in any of these untensed forms, thereby making it impossible to construct a mono-clausal infinitive or participial perfect. Whatever the reason may be, the end result is that the only context in which pre-verbal negation and the perfect can independently co-occur is in the antecedent of a conditional, where we see that unexpectedly, the 'wrong' negation appears.

2.3   A semantic theory and its issues

The current theory that exists in the literature to account for the distribution of *ni* and *na* is the semantic theory proposed by Ramchand (2004). For her, the two negations are distinct negative quantifiers. *ni* is a TP-level negative quantifier over times, asserting something like *"there is no time up to now at which the resultant state holds"*, while *na* is a *v*P-level negative quantifier over events, asserting something like *"there is no event matching this description at the time specified"*. Ramchand (2004) does not provide lexical entries for the quantifiers themselves, relying on the intuitive meanings given above, and the truth conditions of sentences containing the forms.

For a concrete theory of the perfect, Ramchand (2004) follows Parsons (1990), according to whom the perfect introduces a resultant state of an event. This is of course distinct to the tradition of 'extended now' theories of the perfect such as Iatridou et al. (2001), however this distinction will turn out to not be relevant, since the semantic account of the distribution of negative forms will run into other issues.

By assigning the two negative quantifiers different types, Ramchand is able to capture their complementary distribution. Combining *na* with a perfect results in a contradiction given the assumed semantics for each part. Since negation is structural located higher than the perfect, the resulting assertion is that an event occured, yet no resultant state obtained. This is impossible by assumption, since every eventuality induces a resultant state. If the negation were to be interpreted below the perfect (although Ramchand does not consider this possibility), the resulting interpretation would assert that a resultant state of the absence of an event, which is also ontologically deviant. This serves to rule out *na* with perfect verb forms.

In order to rule out *ni* with non-perfect verbs, Ramchand (2004) stipulates that *ni* contains a present tense. We have already seen in (5a) that *ni* constructions are compatible with a past perfect meaning, since ignorance inferences are only compatible with past perfects. However, a friendly amendment to this could solve this issue. If there is assumed to be a null non-future tense associated with *ni*, it would complete tensed verbs below it, yet still

be interpretable as both a past perfect or a present perfect.

However, the critical issue that this account fails is the prediction of semantic incompatibility between *na* and a perfect verb. As was observed in the antecedents of conditionals, *na* is compatible with perfect verb forms when negation is pre-verbal. No contradiction arises between *na* and a perfect verb. Thus the account presented in Ramchand (2004) is not viable as stated. One could imagine that the proposal may be saved by analysing pre-verbal and post-verbal *na* as distinct quantifiers. However, Ramchand herself argues in favour of treating them as the same element in Ramchand (2014).

In the next section, we will see the ingredients of a morphological account of the distribution of *ni* and *na*. By proposing that *ni* is a portmanteau of negation and perfect, the fact that they do not co-occur in normal circumstances can be captured. By making the insertion of the portmanteau sensitive to finiteness, we can capture the fact that it is only in finite clauses that this portmanteau behaviour is observed.

3.   Presenting a morphological approach

3.1   The structure of the spine

Before presenting a morphological analysis to account for the form of negation, it is important to establish the structure of the spine that is being assumed. Bengali is an SOV language, and thus is generally head-final. As per the Mirror Principle (Baker, 1985), the linear order of morphemes reflects their embeddedness. So we can infer the spine from the surface[4]

(8)

Contra Ramchand (2004), I assume that neither *na* nor *ni* are phrasal quantifiers. Rather, negation is a head locted higher than Infl. This is the status of negation in Bengali argued for in (Zeijlstra, 2008, 13) on the basis of the fact that Bengali fails the *why not* test, which determines the phrasal status of negation.

(9)   * kèno na?
          why NEG
          Intended: Why not?

Thus, I will treat negation as a head within the spine.

Unlike the rest of the spine, the left-periphery in Bengali is head-initial. We have already seen this with conditionals, where *if* precedes the antecedent. This is visible with

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[4]I will treat Infl as a single head although evidence exists that T and Agr are separate. They are exponed independently and agreement suppletes for tense. However this is not crucial for the argument here, and so for simplicity, I will ignore it.

regular clausal embedding as well, where embedded clauses are right-extraposed obligatorily, and preceded by the complementizer.

(10) jan-i   je anaròs   kha-o na
      know-1 C pineapple eat-2 NEG

      I know that you don't eat pineapple.

Let's suppose that finiteness, which recall must be distinct from Infl, is a separate head located above negation.

(11)
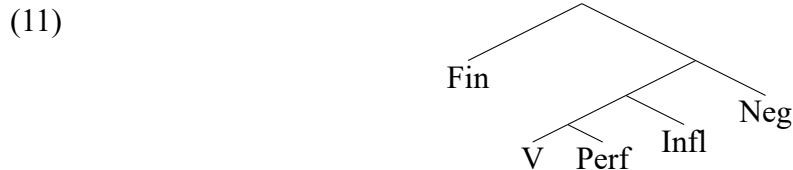
The reason why it must be left-headed will become clear once the mechanism of linearisation is discussed. In brief, it is this variation in headedness along the spine that will help capture the different positions of negation in finite and non-finite clauses in Bengali.

Adopting a featural trigger for head movement as in Arregi and Pietraszko (2018), or linearisation diacritics as in Brody (2000), allows head movement triggers to be built into the syntax. Suppose that if a head bears the trigger $_*$ feature, it triggers head movement of the next head up to it. The crucial benefit of such an approach is that the $_*$ is a feature and thus may be present or absent from different flavours of the same head which all share some core set of properties, but differ in their exact featural specifications. I propose that the Fin head only has the $_*$ feature when it is also [-FIN]. Suppose further than Perf and Infl always have the feature. The resulting trees for finite and non-finite clauses would then be as follows.

(12)   a.

       b.
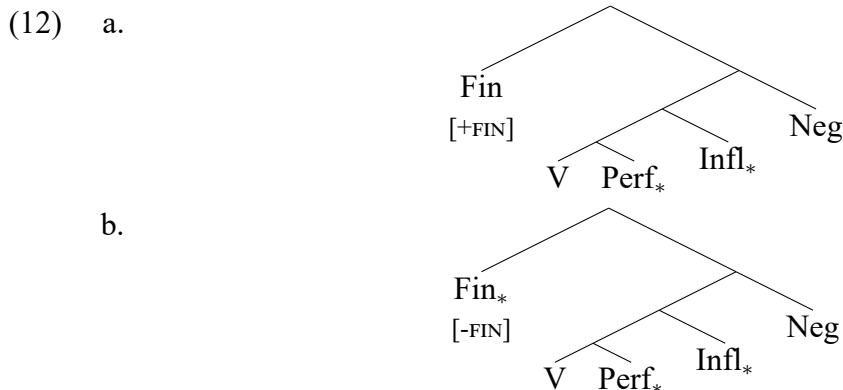
Following the standard assumption in the Distributed Morphology literature (Halle and Marantz, 1993 a.m.o.), I assume that complex heads formed by head movement are realised as morphological words. Those heads that have the $_*$ feature would trigger head movement to them. Assuming that linearisation is sensitive to directionality of branching (though see Kayne (1994) for an alternative view of directionality), this predicts the following linear orders of the elements along the spine:

(13) a. Fin V-Perf-Infl Neg   *finite*

      b. Fin-Neg V-Perf-Infl   *non-finite*

This correctly captures the linear orders of negation in finite and non-finite clauses, as well as establishes the relative heights of heads that will be relevant for the alternation between *ni* and *na*. See Simpson and Syed (2014) and Ramchand (2014) for alternative accounts of the word-order facts.[5]

3.2 *ni* as a portmanteau

Before presenting the background assumptions about morphological structure and vocabulary insertion, it is worth considering the intuition behind why it is reasonable to treat *ni* as a portmanteau. Consider the following minimal pair:

(14) a. mach kha-o na   b. mach kha-o ni

            fish   eat-2 NA   fish   eat-1 NI

            You don't eat fish.   You haven't eaten fish.

The only difference between a negative simple present and the negative perfect is the form of the negation. Given this, it reasonable to conclude that *ni* contains not only the information about negation, but also about the perfect. Thus, *ni* is a portmanteau of negation and the perfect, in that it expones both sets of features. The theoretical status of a portmanteau will be discussed in the following section. This intuition does not presuppose that negation and the perfect are in any particular structural configuration, but rather simply that the same vocabulary item, *ni* in the surface form reflects the presence of both the perfect and negation in the syntactic structure.

3.2.1 How to form a portmanteau

I assume that vocabulary insertion proceeds bottom up, by matching terminals to lexical items (i.e. Distributed Morphology as in Halle and Marantz, 1993, 1994). Broadly, there are four proposals for how portmanteau are realised. A portmanteau, recall, is a morphological form that appears to expone more than one bundle of features.

    The first option is that portmanteau expone more than one bundle of features because those feature bundles are located on the same complex syntactic head. This is the original account of portmanteau from Halle and Marantz (1993). Fusion operates on two heads that are sisters, forming a single terminal of the union of their features, which can then be exponed. However, fusion only operates on sisters (Halle and Marantz, 1993, 136), and

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[5]Both of these accounts have issues which I do not discuss in detail due to space issues. Ramchand (2014) has a detailed discussion of the issues with Simpson and Syed (2014). As for Ramchand (2014), her account predicts negation should be part of the morphological word containing the verb root, yet Lahiri (2000) shows that they are prosodified as separate words.

thus accounting for *ni* as a portmanteau of Perf and Neg is problematic. Unless we violate the Head Movement Constraint (Travis, 1984), Perf and Neg cannot be sisters by head movement, because Infl intervenes between them.

Two of the other proposals for portmanteau that exist also require some notion of locality. Non-terminal spellout models, require either structural adjacency, as in Svenonius (2016), or constituency, as in Caha (2009). Ostrove (2018) proposes a slightly different algorithm, whereby linearisation precedes insertion, and so insertion operates on strings of feature bundles. Thus, portmanteau are realisations of adjacent feature bundles. This then requires linear adjacency of the features to be realised together. But the locality issue noted earlier is problematic for all of these cases.

Recall the structure of the spine proposed, and its linearisation in the finite case:

(15)   a.
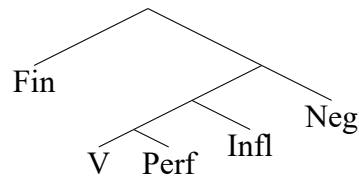
   b.   Fin V-Perf-Infl Neg

Perf and Neg form neither a span as required for Svenonius (2016), nor a constituent as required for Caha (2009), nor a stretch as required for Ostrove (2018), to the exclusion of Infl. But Infl is exponed independently of *ni* in negative perfects.

(16)   mac kha-i/o/e ni
       fish eat-1/2/3 NEG.PRF

       I/you/they have not eaten fish.

This leaves the proposal of Trommer (1999), in which a portmanteau is two cases of contextual allomorphy. One of the two terminals is exponed as the apparent portmanteau in the context of the other, while the other is null in the context of the first. This allows portmanteau to be formed of non-local terminals, as seems to be required for the Bengali case, and thus this is the approach that will be adopted.

3.2.2 Analysis

Suppose that contra Bobaljik (2000), vocabulary insertion is additive, not replacive. Thus, the morphosyntactic features persist in the structure, even after their exponents have been inserted. The relevant vocabulary insertion rules required are as follows:[6]

(17)   a.   [PRF] $\leftrightarrow$ $\varnothing$ / [+FIN], [NEG] […[__
       b.   [PRF] $\leftrightarrow$ -e[7]

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[6]Given the varied headedness of the Bengali spine I am assuming, the brackets in insertion rules is meant only to show relative height. In the context X [__ Z, the the insertion point is below X and above Z.

[7]It's slightly more complicated than this due to the vowel height changes in verb roots. This can be accounted for with floating height features and a gradient notion of height. It is not relevant to the questions at hand, and so are not addressed.
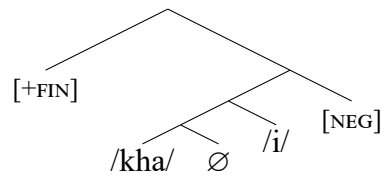
c. [NEG] ↔ ni / [+FIN] [__ […[[PRF]

d. [NEG] ↔ na

Let us see if the additive insertion algorithm truly is required. Consider the minimal pair in (14), repeated below.
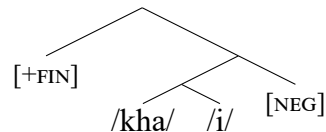
(18) a. mach kha-o na
          fish eat-2 NA

          You don't eat fish.

      b. mach kha-o ni
          fish eat-1 NI

          You haven't eaten fish.

Under a replacive algorithm, at the point of insertion for negation, the structures would look as follows:

(19) a. Negative perfect

[Tree diagram: [+FIN] branching to /kha/ ∅, /i/, [NEG]]

      b. Negative habitual[8]

[Tree diagram: [+FIN] branching to /kha/ /i/, [NEG]]

Since the perfect is exposed as null below negative polarity, there is no phonological trace of it remaining. While the structures are different insertion at a site cannot make reference to the number of nodes below it. Thus, in order to determine which form of negation to use, some trace of the perfect is required. By having additive vocabulary insertion, negation can be sensitive to Perf:

(20)

[Tree diagram: [+FIN] branching to √126 /kha/, [PRF] ∅, [PRES,2] /o/, [NEG]]
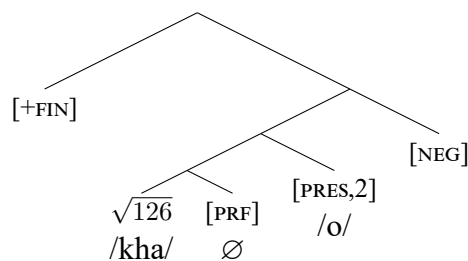
This easily allows the choice of negation to be dependent on whether an unpronounced Perf is present below it.

Readers may be wondering why Neg should be realised as *ni* in this context instead of Perf being realised as *ni* below Neg. Since Perf is closer to the root than Infl, the Mirror Principle predicts then that *ni* should be closer to the root than agreement.

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[8]I am ignoring aspect throughout, but presumably there would be an imperfective somewhere.

(21) a. * kha ni   -o   b.   kha -o ni
          eat NEG.PRF -2   eat -2 NEG.PRF

In order to get the correct order of morphemes, local dislocation would then need to apply. Furthermore, this alternative would still require inward sensitivity to morphosyntactic features, since Neg would need to be realised as null above a Perf exponed as /ni/, but not above the string /ni/ followed by agreement. Notice in the example below, negation is overt, despite it being above the string /...ni/ and agreement.

(22) ama-ke di-o   na
      1-OBL   give-2 NEG
      Don't give it to me

Since this alternative is more complex, requiring all the same properties proposed earlier, in addition to local dislocation, it will be discounted on the grounds of parsimony.

Finally, it is worth noting that the insertion rules are sensitive to the features of Fin as well. This captures the fact that non-finite clauses do not show the portmanteau form, since the context for its insertion is simply not met. Thus, this proposal is able to capture the distribution of negative forms in Bengali clauses by proposing an additive vocabulary insertion algorithm and analysing *ni* as a portmanteau made of two cases of contextual allomorphy.

3.3 Directionality and locality

Theories of contextual allomorphy are defined by the two main claims they make about the relationship between the target of allomorphy and the trigger. These are the directionality and localtiy of suppletion. Directionality refers to whether the target of an allomorphic process can/must be structurally higher or lower than the trigger, and what features of the trigger it can be sensitive to in each configuration. Locality refers simply to the distance between the target and the trigger for allomorphy.

3.3.1 Directionality

The theory proposed permits both inward and outward sensitivity to morphosyntactic feature values. Both parts have precedent in the literature. Outward sensitivity is a hallmark of Bobaljik (2000). In this case, it is crucial in order to allow [PRF] be null below [NEG],[+FIN]. However, contra Bobaljik (2000), and following Carstairs-McCarthy (2001), inward sensitivity to morphosyntactic features is also permitted. This is crucial to allow [NEG] to be realised as *ni* above a null [PRF].

Thus, this is a bidirectional theory of morphosyntactic sensitivity. Bidirectionality is required because of the way the portmanteau *ni* was analysed. Since, the portmanteau is analysed as two cases of suppletion, both terminals participating in the allomorphic process must be sensitive to the other. As was observed, this sensitivity must be morphosyntactic, since the lower terminal is being realised as null in the context of the upper terminal.

This brings us to the question of why the portmanteau must be analysed as two cases of suppletion. Recall that the reasoning pertained to the notion of locality. Analysing portmanteau as two cases of suppletion permits discontinuous portmanteau as it were, where the two terminals being jointly exponed are not local in the relevant sense.

3.3.2 Locality

While the proposal thus far has assumed that targets and triggers for allomorphy can take effect at a distance, this is not an uncontroversial view. Arregi and Nevins (2012) have put forth the claim that linear adjacency is required for allomorphy, adopting the view that linearisation precedes vocabulary insertion. Embick (2010) meanwhile has proposed that structural adjacency is required. Note that this debate is distinct from the one discussed earlier about the distance at which two heads can form a portmanteau.

While Arregi and Nevins (2012) and Embick (2010) present strong evidence in favour of locality restrictions on allomorphy, Moskal (2015) notes that roots and affixes do not seem uniform in what these restrictions are. Based on Veselinova's (2006) survey of verbal suppletion, Moskal (2015) shows that roots require strict locality to supplete (i.e. maximally verb roots supplete for aspect, never mood for example), but affixes can supplete at arbitrary distances from each other.

Moskal argues this is linked to whether a category defining head interves between the target and trigger.[9] The crucial portion for this analysis is the observation that since [PRF] and [NEG] are both affixes outside of *v*, locality should not be an issue.

The analysis of Moskal (2015) is supported by light verb constructions in Bengali, which can be constructed with a perfect participle, yet never show the perfect negation. In these cases, the light verb contributes some meaning, however the perfect participle is clearly the main verb semantically. For example, the light verb 'drop' conveys a meaning of an action done accidentally, while 'die' conveys an action done with difficulty or in a futile way.

(23) a. khe-e phel-b-e   na!
          eat-PRF drop-FUT-2 NEG

          Don't eat it! (accidentally/absent-mindedly)

      b. por-e   mor-o na!
          wear-PRF die-2 NEG

          Don't wear it! (with such difficulty)

Despite being mono-clausal, the presence of an intervening light verb blocks the locality between [PRF] and [NEG], and prevents the perfect negation from appearing. This can be captured if AUX is deemed to not have a category label *v*, but light verbs do.[10] Thus, with

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[9] I have not not opted to include category-defining heads in my trees for simplicity. Nothing changes if they are present.

[10] Perhaps AUX is inserted late to carry morphology when the verb is unable to (Bjorkman, 2011).

regular perfects, no category label intervenes, and the allomorphy can proceed. However with light verbs, the target and the trigger for the two cases of suppletion are separated by a category label, and thus insufficiently local to permit allomorphy.

Thus, while this proposal involves non-local suppletion, given that both the target and the trigger are affixal, the non-locality is expected to be acceptable.

4.   Conclusion

Bengali has two morphemes used to negate clauses: *ni* for perfect verbs, and *na* elsewhere. The existing proposal for their distribution analyses the two negations as distinct negative quantifiers, each incompatible with the context of the other. This paper presents new evidence from antecedents of conditionals, where perfects appear with *na*, and argues that the alternation is better analysed as morphological.

In order to account for the distribution of *ni* and *na*, the perfect negation *ni* is analysed as portmanteau of Neg and Perf, in a model where portmanteau are two cases of mutually conditioned allomoprhy. Thus Perf is null below a negation, and Neg is realised as *ni* above the feature [PRF]. This requires allomorphy to have bidirectional sensitivity to morphosyntactic features. In order to permit this, the algorithm for vocabulary insertion, if it is to proceed from the root outward, must be additive, rather than replacive.

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