

BLOCKING EFFECTS OF HIGHER  
NUMERALS IN BANGLA:  
A PHASE-BASED ANALYSIS

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## 1 Introduction

This squib explores a paradigm of blocking effects that occurs with phrasal movement taking place within nominal phrases in Bangla. We develop an argument that nominal constituents in Bangla project a mid-level QP phase below possessor phrases and demonstratives, which requires successive-cyclic movement through its edge in order to satisfy the Phase Impenetrability Condition (Chomsky 2000). If a higher DP level of structure is also assumed to project as a phase in Bangla, this raises the possibility that the fully extended projection of noun phrases may contain two separate phases, in a way that resembles the occurrence of two phasal levels within clauses. The patterns reported in the squib also contribute to ongoing investigations into variation in the structural realization of numerals within nominal projections and how this may manifest itself in morphology and syntax with different effects (Franks 1994, Bailyn 2004, Shlonsky 2004, Matushansky and Ionin 2006, Danon 2012).

## 2 A Blocking Effect on Two Patterns of Movement within Bangla Nominal Phrases

In Bangla noun phrases, there is a fixed neutral order of lexical and functional elements, which only allows for certain alterations under special conditions of focus and definiteness licensing, to be described shortly. This ordering is represented in (1) and illustrated in (2). We take the regularized, neutral ordering of elements such as possessors, demonstratives, quantifiers, and classifiers as evidence that these instantiate a series of functional categories projected above NP, which we explicitly label as in (3) (see also Bhattacharya 1999, Chacón 2012, Dayal 2012, Syed 2014).<sup>1</sup>

- (1) Possessors > Demonstratives > Quantifiers > Classifiers  
> NP
- (2) amar oi du To lal boi  
my DEM 2 CL red book  
'those two red books of mine'
- (3) [DP POSS [DeicP Dem [QP Q [CIP Cl [NP (AdjP) N]]]]]

Certain restricted alterations of the neutral base order of constituents in (1) may occur for reasons relating to interpretation, revealing additional structural properties of Bangla nominal phrases. First, the NP constituent to the right of a classifier regularly undergoes repositioning to the left of the classifier and any numeral present when the nominal phrase has a definite interpretation (Chacón 2012, Dayal 2012), as shown in (4b). If this movement does not occur, as in (4a),

<sup>1</sup> The following symbols are used to represent sounds in Bangla: T, D, R represent retroflex /t/, /d/, /r/; S, palato-alveolar /s/; N, a velar nasal; M, nasalization; and O, a low-mid back rounded vowel.

a sequence of [Numeral Classifier (Adjective) Noun] will necessarily be interpreted as indefinite. For concreteness, we label the position that attracts the NP when a definite interpretation occurs as *DefP*, and we assume that the licensing of definiteness features in the head of *DefP* causes the movement of the NP to take place, as in Chacón 2012.

- (4) a. [<sub>QP</sub> du [<sub>CIP</sub> To [<sub>NP</sub> lal boi]]]  
           2          CL      red book  
           ‘two red books’  
       b. [<sub>DefP</sub> [<sub>NP</sub> lal boi]<sub>k</sub> [<sub>QP</sub> du [<sub>CIP</sub> To t<sub>k</sub>]]]  
                   red book      2          CL  
           ‘the two red books’

When a demonstrative occurs to add specifically deictic information, the leftward movement of the NP occurs to a position between the demonstrative and the numeral, as in (5).

- (5) [<sub>DeicP</sub> oi [<sub>DefP</sub> [<sub>NP</sub> lal boi]<sub>k</sub> [<sub>QP</sub> du [<sub>CIP</sub> To t<sub>k</sub>]]]]  
           DEM          red book      2          CL  
           ‘those two red books’

Second, adjectival phrases may undergo further leftward movement to a position to the left of the demonstrative to encode heavy focal emphasis of the adjective, as in (6). Following Syed (2014), we take this movement to occur to the specifier of a Focus Phrase (*FocP*) projected below the position of possessors, as shown in (6).

- (6) [<sub>DP</sub> amar [<sub>FocP</sub> [<sub>AdjP</sub> khubi dami]<sub>m</sub> [<sub>DeicP</sub> oi [<sub>DefP</sub> [<sub>NP</sub> t<sub>m</sub>  
           my          very red          that  
           boi]<sub>k</sub> [<sub>QP</sub> du [<sub>CIP</sub> To t<sub>k</sub>]]]]]  
           book      2          CL  
           ‘those two *very red* books of mine’

In this squib, we will focus on the observation that nominal-internal movement for definiteness and/or focus is critically sensitive to and constrained by the presence of numerals in *QP*, between the base position and the landing site of *NP/AdjP* elements moved to higher positions. This kind of movement is acceptable when the low numerals 1–4 occur, but impossible when higher numerals are present.<sup>2</sup> This is illustrated first with the leftward movement of an *NP* over a numeral to encode a definite reading of the nominal phrase. As (7a–b) show, this is possible over low numerals, but not when higher numerals are present.<sup>3</sup>

<sup>2</sup> When the numeral 5 occurs, movement across the numeral is accepted by some speakers but not others. All speakers seem to reject movement across numerals 6 and higher.

<sup>3</sup> We do not include the numeral 1 in the examples here as the use of 1 often seems to be subject to idiosyncratic restrictions that are not clearly syntactic in nature.

- (7) a. [[lal boi]<sub>k</sub> du To/tin Te/char Te t<sub>k</sub>]  
 red book 2 CL/3 CL/4 CL  
 ‘the 2/3/4 books’  
 b. \*[[lal boi]<sub>k</sub> choy Ta/sat Ta/at Ta/nau Ta t<sub>k</sub>]  
 red book 6 CL/7 CL/8 CL/9 CL

Second, focus movement of an AdjP is possible only when low numerals occur, not with higher numerals.

- (8) a. [khubi joghonyo<sub>k</sub> oi du To/tin Te/char Te t<sub>k</sub> biskut]  
 very disgusting DEM 2 CL/3 CL/4 CL biscuit  
 ‘those very *disgusting* two/three/four biscuits’  
 b. \*[khubi joghonyo<sub>k</sub> oi choy Ta/sat Ta/at Ta t<sub>k</sub> biskut]  
 very disgusting DEM 6 CL/7 CL/8 CL biscuit

In addition to movement of AdjPs and NPs, it is possible for the complements of Ns to undergo nominal-internal focus raising from their base position to the right of Cl; this movement is again only acceptable when low and not high numerals are present.

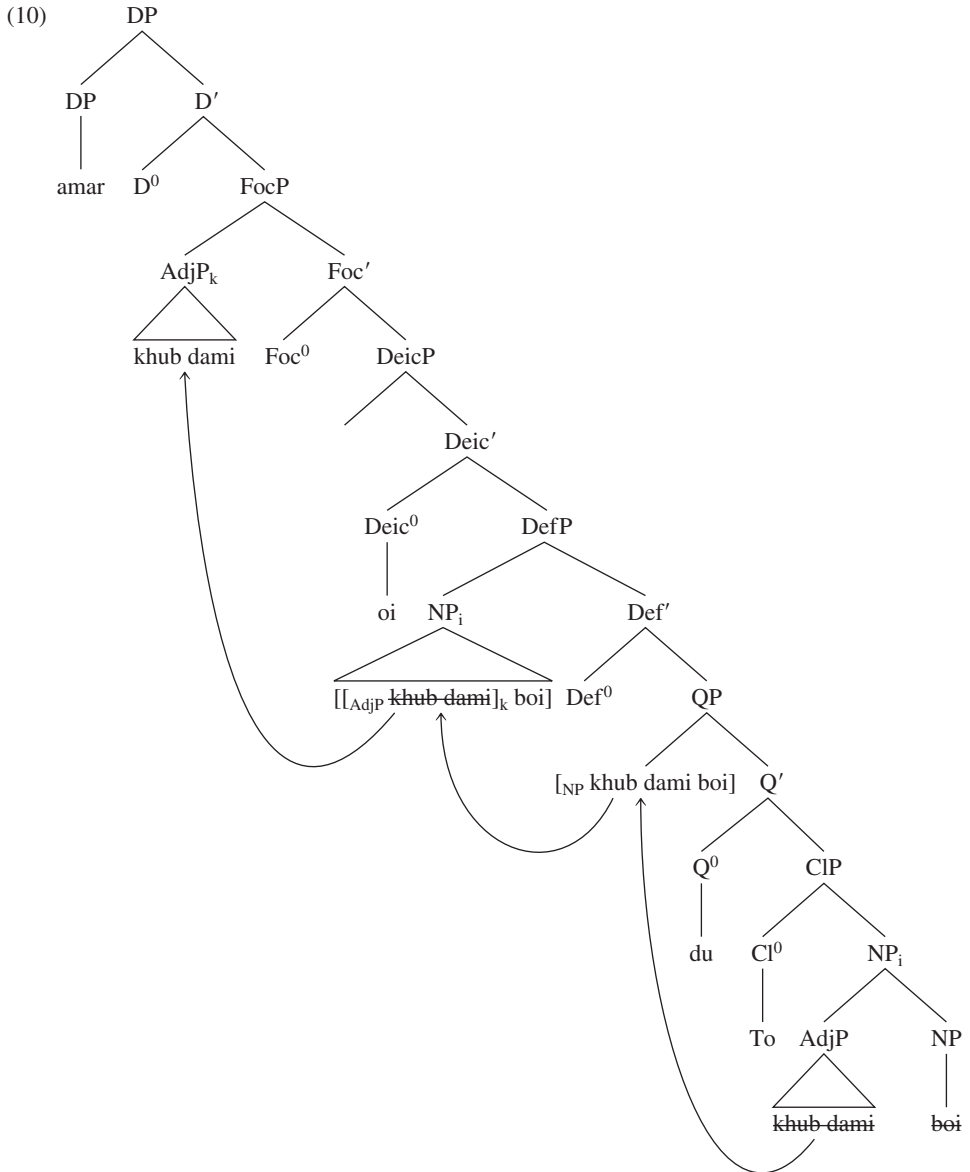
- (9) a. du jOn dorSonSaStr-er odhyapok  
 2 CL philosophy-GEN professor  
 ‘two professors of philosophy’  
 b. [dorSonSaStr-er]<sub>i</sub> du/\*at jOn t<sub>i</sub> odhyapok  
 philosophy-GEN 2/8 CL professor

Any attempt to raise a phrasal constituent past high numerals is consequently blocked within Bangla nominals, though fully licit when lower numerals occur. What might be the cause of the numeral-related differences in grammaticality found in (7)–(9)? As there are no obvious semantic reasons why higher numerals should block phrasal movement relating to definiteness and focus, the unacceptability of examples such as (7b)/(8b)/(9b) requires some kind of syntactic, structural explanation in which the roles of high and low numerals are distinguished. Building on various new studies of the syntax of numerals, we now develop such an account, and then examine its consequences.

In recent years, investigations of various syntactic patterns with numerals have advanced the theory that there is both crosslinguistic and language-internal variation in the projection of numerals and that such elements may occur in certain instances as X<sup>0</sup> heads and elsewhere as phrasal specifiers. This conclusion has been argued for effectively on the basis of a variety of empirical phenomena found in different languages (see Franks 1994, Bailyn 2004, Shlonsky 2004, Borer 2005, Pereltsvaig 2006, Danon 2012). It connects with a wider body of work arguing that other lexical elements such as markers of negation, demonstratives, adverbs, and pronouns may occur in either specifier or head positions both across languages and within a single language, as revealed by different sets of syntactic evidence (Ouhalla 1990, Soh 2001, Wood 2003, van Gelderen 2004, Simpson and Syed 2014).

We believe that such analyses offer the critical key to understanding the numeral-related patterns in Bangla, and we suggest that the contrasts in (7)–(9) are primarily due to a simple but important difference in the structural position of low and high numerals in Bangla noun phrases. We posit that low numerals occur as heads in QP, while high numerals are projected in Spec,QP. Such a difference in the structural location of low and high numerals provides a direct way of accounting for the blocking effect caused by high numerals. It can be assumed that phrasal elements base-generated in the NP domain that undergo raising to positions related to definiteness and focus must move successive-cyclically through Spec,QP in order to reach these higher positions, and that when Spec,QP is occupied by a higher numeral, it creates an intervention effect and serves to block the movement.

Spec,QP therefore functions as a nominal-internal escape hatch, facilitating movement to higher positions within noun phrases. This is similar to other well-known patterns of escape hatch phenomena: for example, the need for extraction out of a noun phrase to pass through the highest specifier position in the noun phrase (Szabolcsi 1994) and the need for long-distance *wh*-movement to pass through Spec,CP as a clausal escape hatch (e.g., McCloskey 2000). Low numerals base-generated in the head position of QP (Q<sup>0</sup>) will freely allow NP and AdjP constituents to make use of this Spec,QP escape hatch and raise out of QP to higher nominal-internal positions, accounting for the well-formedness of examples such as (6), (7a), (8a), and (9a), where a low numeral occurs. Structure (10) represents the full derivation of (6), in which the NP moves via the Spec,QP escape hatch to Spec,DefP. This is followed by further movement of the AdjP beyond the demonstrative *oi* to the focus-related position below the possessor *amar* ‘my’.



The posited difference in the structural location of lower and higher numerals in Bangla, which allows for a simple account of the alternations in (8)–(10), correlates with another morphological phenomenon that distinguishes the low numerals 2–4 from all higher numerals. Classifiers combined with 2–4 show special enclitic forms (*To* with 'two', *Te* with 'three' and 'four'), not the regular *Ta* classifier

that occurs with all higher numerals. It can be suggested that the occurrence of these irregular enclitic classifiers with the lower numerals has resulted from the structurally closer head-to-head relation that low numerals bear to classifiers. Specifically, the suggestion is that classifiers base-generated in the head  $Cl^0$  (Chacón 2012) attach to and fuse with the preceding numeral head, perhaps via head movement of the classifier to  $Q^0$ , and that this close attachment conditions the sound change in the coda of the classifier. By contrast, classifiers with larger numerals (hypothesized to be in Spec,QP) pattern more like phrasal clitics, attaching to a preceding phrasal constituent and consequently showing no parallel affix-like sound mutations.

Additional, related support for this view is provided by patterns found with nonnumerical instantiations of QP. While quantifiers such as *Sob* ‘every’ and *prottek* ‘each’ regularly block any leftward focus movement of NP/AdjP and so can be analyzed as occurring in Spec,QP, the quantifier *kOyek* ‘some/a few’ does permit movement to occur. However, NP/AdjP may raise over *kOyek* only if *kOyek* occurs in a reduced enclitic form, *kO-*, as illustrated in (11b). This is naturally accounted for if the full form *kOyek* is projected in Spec,QP, as in (11a), like other nonnumerical quantifiers and higher numerals, but its reduced enclitic form is projected in the head position of QP (11b), thus allowing movement to occur through Spec,QP.

- (11) a. \*[[<sub>NP</sub> lal boi]<sub>i</sub> [<sub>QP</sub> kOyek [<sub>CIP</sub> Ta t<sub>i</sub>]]]  
           red book    some           CL  
           ‘a few *red books*’  
       b. [[<sub>NP</sub> lal boi]<sub>i</sub> [<sub>QP</sub> t<sub>i</sub> kO [<sub>CIP</sub> Ta t<sub>i</sub>]]]  
           red book           some           CL

### 3 Successive-Cyclic Movement, the Phase Impenetrability Condition, and Phases

The intervention effects caused by higher numerals in Bangla can be argued to provide important novel evidence bearing on how the internal structuring of nominal projections generally constrains movement. Although related blocking effects have previously been attested with the extraction of phrases out of noun phrases, as for example in Spanish, where the presence of a structurally higher phrase inhibits the extraction of a lower phrase (Torrego 1987, Ticio 2005), the Bangla patterns examined here may be the first clear observation of intervention effects on movement occurring more locally in noun phrases, with phrasal movement that takes place fully within a nominal projection.

This movement has two principal characteristics. First, it is caused by properties of focus and definiteness. Second, the movement needs to pass through Spec,QP on its way to higher definiteness/focus-related positions. Critically, there is no quantificational feature in Q that causes movement of an NP/AdjP to its specifier, as there is no raising of NPs/AdjPs to Spec,QP in the absence of interpretations of focus or

definiteness, and movement to and through Spec,QP only takes place when an element needs to reach a higher position. Additionally, it can be noted that numerals in Spec,QP have no definiteness features to license and so are not competing with NPs and AdjPs as more local targets for movement to the higher definiteness-related position. NPs and AdjPs that move through Spec,QP and higher numerals base-generated in Spec,QP thus appear to be in competition for a purely structural, unique position (Spec,QP) and are featurally unrelated to each other. This argues against any analysis of the blocking/intervention effect that might attempt to attribute it to a Relativized Minimality-type effect in which the intervener (the numeral) shares features with a lower element and so blocks movement of the latter to a higher functional head searching for a particular type of feature.<sup>4</sup> What the successive-cyclic movement of NPs and AdjPs through Spec,QP then indicates is that Spec,QP functions as a structural escape hatch for elements in the lower part of nominal projections that need to enter into agreement relations with a higher probe: an element must first reach and pass through Spec,QP in order to be able to proceed higher within the nominal structure.

From a Minimalist perspective, the only reason for this kind of movement, which occurs solely so that an element becomes visible to a higher probe, is to avoid a violation of the Phase Impenetrability Condition (PIC; Chomsky 2000:108).

(12) *Phase Impenetrability Condition*

In phase  $\alpha$  with head H, the domain of H is not accessible to operations outside H, only H and its edge are accessible to such operations.

<sup>4</sup> The patterns also argue against a Relativized Minimality account that would posit that Q-features present in Q-type elements might block movement between higher definiteness and focus-related projections and lower AdjPs/NPs. If the presence of such features in Q-elements could block the movement of lower AdjPs/NPs, one would naturally expect that *all* Q-elements would have these features, and the blocking effect would not be found only with higher numerals. The observation that it is just certain Q-elements—higher numerals and the full form of *kOyek* ‘some’—that block movement makes a structural account much more plausible, in which only the Q-elements projected in Spec positions will cause movement through such a position to be ill-formed. A reviewer also notes that the essence of a Spec-head structural account could not easily be incorporated into a Relativized Minimality feature-based approach, as both Spec,QP and Q asymmetrically c-command AdjP/NP and so should intervene in parallel ways if Q-elements in Spec,QP and Q both had a relevant blocking Q-feature. Consequently, an account seems to be called for that does not crucially invoke features on Q-elements as the cause of the intervention effects (wherever these features might be present) and instead attributes the ungrammaticality of examples such as (7b), (8b), (9b), and (11b) to the need for movement of AdjPs/NPs through Spec,QP. Many thanks to the reviewer for comments on this point.

The PIC significantly distinguishes phases from nonphasal constituents, automatically rendering the complement of the phasal head opaque for external Agree relations and triggering movement of elements with unlicensed features to the edge of the phase (Legate 2003, Bošković 2005, Aboh et al. 2010). The important conclusion this naturally leads to in the case of Bangla definiteness and focus-related AdjP/NP movement is therefore (a) that QP is in fact a *nominal-internal phase*, forcing successive-cyclic movement to occur through its specifier/edge when elements from within QP need to enter an Agree relation with functional heads in a higher part of the noun phrase, and (b) that phases may therefore be projected in embedded positions within nominal projections and not simply occur as the highest (DP) projection of a nominal constituent, as has often been assumed.

This conclusion—that QP projects as a phase in Bangla—can also be advanced under a slightly different view of the intervention effect described here, which has assumed that QPs in Bangla project a *unique* specifier position, and if this position is occupied, no other phrase will be able to transit through Spec,QP. Alternatively, it would be possible to adopt the analysis of phase edges proposed by Bošković (2016), who argues on the basis of extraction phenomena found in Serbo-Croatian that all phases allow for *multiple* specifiers, but that there is an important asymmetry in the status of the outer and inner specifiers of a phase, and only the outer specifier is visible to elements in a higher phase (see Bošković 2016 for full justification of this view). If one combines this approach with Richards's (2001) view of "tucking-in" movement, when an AdjP/NP in Bangla is moved to a Spec,QP position already occupied by a higher numeral, this movement will result in the AdjP/NP tucking in as a lower specifier; in such an inner phasal specifier position, it will not be visible to probes in a higher phase, resulting in the blocking effect and the impossibility of movement, even though multiple specifier positions might theoretically be available with QP. Either a single-specifier or a multiple-specifier analysis of QP constituents in Bangla can therefore be argued to lead to the same conclusion: that the blocking effect of higher numerals on movement can most naturally be accounted for as a PIC effect, with QP projecting as a phase within nominal expressions.

Finally, it can be stressed that QPs exhibit their phasal behavior in Bangla in the presence of other structurally higher functional elements within nominal constituents, whose regular neutral sequencing suggests the occurrence of a range of projections above QP, as depicted in structure (10). If Bangla nominals therefore can be assumed to project from QP up to a higher DP level of structure as shown in (10), and if such constituents pattern as phases as in other languages, a significant conclusion would be that nominal projections might in general consist of *two* phasal cycles—an internal, mid-level phase (QP) and a higher-level phase (DP)—and hence resemble clauses in being bi- rather than monophasal constituents, as might be expected given



other structural parallels that exist between clauses and nominal expressions (Abney 1987, Szabolcsi 1994). Further empirical evidence for the occurrence of DP-level phases in Bangla needs to be explored in future work and is beyond the scope of this squib, but the possibility now certainly presents itself that the internal phasal structure of clauses and nominal constituents may be more similar than previously assumed.

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