Numeral/Quantifier-Classifier as a complex head

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This paper[1] claims that the complex consisting of the quantifier or the numeral in combination with the classifier in the Eastern Indo-Aryan language Bangla (Bengali)[2] may be considered as a semi-lexical head in the sense that the complex exhibits several properties which are divided between lexical and functional heads. The thrust of this claim is most clearly visible in the analysis of NP movement inside the DP in section 3 which involves the complex as a whole and not some smaller part of it. In the first section of the paper, the semi-lexical nature of the complex head Numeral/Quantifier-Classifier (Num/Q-Cla hereafter) is considered followed by a brief discussion of five Zwicky criteria of head determination in section 2.

1. Semi-lexicality of the Num/Q-Cla complex

In Bhattacharya and Dasgupta (1996: 73) it was proposed that South Asian languages are to be typologically bifurcated into Gender languages (typified by Hindi which is a classifier-less language) and Class languages (typified by Bangla which is a gender-less language). Classifiers in Bangla include the default classifier *Ta*[3] - the main variety to be discussed in this paper, the collective classifier *gulo*, the human classifier *jon*, the inanimate count classifier *khana*, the inanimate mass classifier *khani*, the numeral absorbing human collective classifier *ra* etc. (see Dasgupta 1983). Examples (1) to (5) illustrate the various uses of these classifiers.

(1) a. *chele-Ta*
         boy-CLA
         'the boy'
     b. *du-To*
         two-CLA
         'two'
     c. *bon-Ti*
         sister-CLA
         '(affectionate) sister'
     d. *tin-Te*
         three-CLA
         'three'

(2) *chele-gulo*
     boy-CLA
     'the (group of) boys'

(3) *du-jon*   lok
     two-CLA   person
     'two persons'

(4) *du-khana* baRi
     two-CLA   house
     'two houses'

(5) *Onek-khani* doi
     a lot-CLA   yoghurt
     'a lot of yoghurt'

Note that the default form of the common classifier *Ta* has various allo-
morphs governed by phonological conditions. *Te* occurs with 'three' and
'four' as in *tin-Te* 'three-CLA', *car-Te* 'four-CLA' - historically *car* is
derived from /cari/ with the terminal high vowel which raises *Ta* to *Te*, in
free variation with *Ta* in *ei/oi-Ta/Te*, 'this/that-CLA' where the exact tran-
scription should be *ey/oy* for the demonstrative, *y* denoting a high glide.
The allomorph *To* occurs only with 'two', again, explained in terms of
vowel harmony. *Ta* occurs with the rest of the numerals and with other
nouns. The example in (1c) additionally shows that the form of a particular
classifier may also be governed semantically, in this case, the intended

sense of affection is encoded by the use of the classifier *Ti* instead of the usual, *Ta*.

The examples above also show that a numeral or a quantifier in Bangla must be followed by a classifier, that is, they form a complex structure. This fact of the language describes the abridged title of the paper and in what follows, I will discuss several criteria for considering this complex as a semi-lexical head.

1.1. Criteria for Semi-Lexicality of the Num/Q-Cla Head

The criteria to be discussed in this section are based on the notion of disguised X^0 or semi-lexicality in Emonds (1985). He looks at syntactic categories outside the core consisting of the non-phrasal categories N, V, and A plus any material in their specifiers (notated as SP(X) in Emonds) and concludes that "... all grammatical formative categories are either "disguised" instances of X^0 or SP(X) themselves, or are *sub*-categories (= features) of X^0 and SP(X)" (Emonds 1985: 158).

Thus for Emonds, the three closed subsets of open categories are "grammatical" Ns, Vs and As. Some examples of closed categories that are reduced to SP(X) are as follows:

(6)　　SP(N) = *this, that, these, ... all, both, each, which, what*, etc.
　　　　SP(V) = *will, can, ...*
　　　　SP(A) = *-er, -est*
　　　　SP(P) = *right, clear*

Some closed categories, on the other hand, are reduced to X^0s and are called disguised X^0s. Some typical examples follow (Dis here is meant to stand for disguised):

(7)　　Dis(N) =　*one*
　　　　Dis(V) =　auxiliaries
　　　　Dis(A) =　*hard, fast, long (Adverbs), other, same, different,*
　　　　　　　　　　such (nouns), many, few, much, etc.
　　　　Dis(P) =　*as*

In what follows, I discuss some of the criteria for determining what is a disguised or a semi-lexical category according to Emonds and conclude that the Num/Q-Cla complex is one such category.

(i) A theory neutral reason for semi-lexicality of the complex is that it is used quite generally although semantically it is less transparent. For example, the classifiers *Ta/To/Te/Ti* (to be identified by *Ta* henceforth) in Bangla have widespread use but semantically they are non-transparent (see (8)).

(8)   a.   *chele-Ta aSbe*
            boy-CLA come.will
            'the boy will come.'
      b.   *jOl-Ta   gOrom holo*
            water-CLA hot   happened
            'the water became hot.'
      c.   *radha-r baRi   aSa-Ta*
            Radha's home   coming-CLA
            'Radha's coming home.'
      e.   *bon-Ti   amar*[4]
            sister-CLA mine
            'my (affectionate) sister!'

(ii) Yet, there is a small class within this closed class which can be distinguished from each other where each classifier can have a unique usage and meaning (see (9)). According to Emonds (1985: 168), this is an indication that this subclass is a disguised X class or semi-lexical.

(9)   a.   *du-jon   chele*
            two- CLA boy
            'two boys'
      b.   *du-khana ruTi*
            two- CLA   bread
            'two (pieces of) bread'
      c.   *du-joRa   juto*
            two- CLA   shoe
            'two pairs of shoes'
      e.   *du-gocha phul*
            two- CLA   flower
            'two bunches of flowers'

(iii) Universally classifiers are derived from nouns. Also (as per Klein (1980) mentioned in Emonds (1985: 163)) certain quantifiers like *many, few* etc., although behave as disguised Adjectives, are more like Spec(N)

material, that is, they exist in the domain of NP. It is possible therefore to see the Num/Q-Cla complex as a disguised noun. In the rest of the paper, I will consider the numeral as occupying the same slot as the quantifier given that numerals in some sense quantify the following complement.

(iv) The Num/Q-Cla complex also exhibits properties of a closed class in being limited in productivity or possessing a small number of members and not encouraging novel coinages. Refer to the table in (16) which depicts the limited membership of the class as a whole.

(v) Emonds (1985: 160) also observes that semi-lexical categories cannot be expanded. In other words, they cannot be used as the left-hand item of a syntactic re-write rule or further sub-divided. I have discussed this in detail in section 3 where I have argued against splitting this complex into two separate heads Q and Cla, i.e. Q→Q+Cla is not possible. As mentioned at the end of section 1, a Q or a Cla alone cannot be used with a noun[5]:

(10)   a.   *(*du*)-*To boi   dao*
                 two-CLA book give.2
      b.   *(*kO*)-*jon   chele eSechilo*
                 some-CLA boy   came

(vi) Another property of these semi-lexical categories that Emonds (1985: 165) mentions is their Unique Syntactic Behaviour. Although I do not see a direct application of this property in the present context, a related property of semi-lexical categories is that a whole subclass of a particular category may be affected by a particular syntactic operation. This can be shown for the Bangla quantifier *SOb* 'all' and other quantifiers (which I call Non-All Quantifiers or NAQs) as explored in section 3[6]. Thus, if we consider Q as a subclass of the category Num/Q-Cla, and if it is true that well defined syntactic rules do apply to this subclass, then the category Num/Q-Cla as a whole is semi-lexical by this criterion.

(vii) Lastly, the duality of status in terms of whether a particular head is functional or lexical makes a case for the semi-lexical nature of the complex head. I will discuss this in detail in the next section.

1.2.   *Functional or lexical head*

In this section, I discuss in the following two subsections the functional or the lexical status of the semi-lexical head under consideration. Facts from the phenomenon of *stranding* suggest that the complex can be considered

lexical (section 1.2.1) but by certain other criteria, it may be considered functional (section 1.2.2).

1.2.1. Num/Q-Cla as a lexical head

Stranding is discussed further in section 3 drawing on Bhattacharya (1998a, 1999a). In this section, I discuss briefly the phenomenon of quantifier-float inside the DP in Bangla. This phenomenon will be shown not to be restricted to the universal quantifier but is obtained with any other quantifier as well.

First, let us see how the Num/Q-Cla complex occupies the *space*[7] between the heads D and N. This space is shown to be uniquely occupied by a Quantifier Phrase QP in Löbel (1989) who observes that the relation between the quantifier and the noun is that of countability or rather the function of the category quantifier is to ensure the countability of the NP. For a [+Count] noun, the Q head is morphologically realised as a plural suffix in English and German:[8]

(11)   a.   *drei* [$_Q$ Ø] *Bäum-e*
           three   tree-s
       b.   *drei* [$_Q$ *Stück*] *Wild-Ø*
           three   head   game
           'three head of game'

In (11b) *Wild* is a non-discrete substance and the measure noun *Stück* is inserted to quantify over the noun whereas for *Bäum-e* the countability is marked by a suffix. Löbel shows that Q as a functional category has the status of a head (Löbel 1989: 151). She also mentions that in numeral-classifier languages, the Q is lexically realised as Num+Cla. In Bangla, for example, the examples in (13) are similar to the set in (12) if we consider that the verb in (13) *governs* a zero noun. More crucially, we see that in (12) the quantifier involved quantifies over nouns, whereas in case of (13) the quantifier quantifies over the zero noun.

(12)   *kichu-Ta/   SOb-Ta/ khanik-Ta/ Onek-Ta   doi*
       some-CLA/   all-CLA/   some-CLA/   a-lot-CLA   yoghurt
       'some/ all of the / some/ a lot of yoghurt.'

(13)   *kichu-Ta/   SOb-Ta/ khanik-Ta/ Onek-Ta dekhechi*
        some-CLA/   all-CLA/   some-CLA/ a lot-CLA seen.1
        'I have seen some/ all/ some/ a lot of it.'

The fact that Q-float in DPs follow the same pattern as in the clauses is shown in Shlonsky's (1991) work on Q-DPs in Hebrew. Now consider the following where the quantifier/numeral *kO/ tin* 'some/ three' both allow quantifier float shown schematically in (14b) (see section 3.1 for more examples):

(14)   a.   *kO-Ta/ tin-Te*   *chele* → *chele kO-Ta/ tin-Te* ~~chele~~
            some-CLA/ three-CLA   boy
            'some/ three (of the) boys'[9]

       b. $[_{DP} (D)\ Q+Cla\ NP] \rightarrow [_{DP} (D)\ NP_i\ Q+Cla\ t_i]$[10]

Notice that in this example, the object rather than the subject floats. This possibility is encouraged by Bobaljik's (1995: 131) claim that object-oriented floating quantifiers *are* possible in object-shift languages. I conclude that NP shift in (14) above leaves the quantifier complex stranded in the sense that it is followed by an empty NP position.

    Stranding therefore establishes the headedness of the complex. According to Abney (1987) one criterion for functional heads is that these heads are usually inseparable from their complements. In earlier work, I have shown (as a consequence of Linear Correspondence Axiom (or LCA) as operative in head-final languages) that NP movement (rather than noun movement in SVO languages) inside the DP is due to a feature of [SPECIFICITY] of the complex head. Thus, the fact that the configuration {Num/Q-Cla, t} (as in (14b)) is possible in the Bangla DP indicates that the complements of the complex are separable from it which makes the status of the complex head lexical.

    Although, unlike other lexical categories in other languages the complex does not inflect for number or gender, I will consider (here and in the rest of the paper) the possibility that the classifier is the remnant of agreement in a language without any noticeable agreement at the clause level.[11] This approach, therefore, brings the complex category in line with other lexical categories. Thus (15) shows agreement between a mass noun and a mass classifier (15a), a count noun and a count classifier (15b), and a noun indicating pair and *pair* classifier (15c).

(15) a. *Onek-khani doi*
         a lot-CLA   yoghurt
         'a lot of yoghurt'
      b. *Onek-gulo chele*
         a lot-CLA   boy
         'a lot of boys'
      c. *kOek-joRa juto*
         some-CLA   shoe
         'some pairs of shoes'

I will come back to this point in section 2.1 where we talk about agreement as a criterion for head determination.

1.2.2. Num/Q-Cla as a functional head

The argument that functional heads define a closed class is shown to work to some extent for the complex. The following table shows the various combinatorial possibilities between a quantifier and a classifier

(16) *Table showing Q + Cla combinations:*

QUANTIFIERS		CLASSIFIERS			
		-Ta	Gulo	khana/ khani	jOn
			[+count]	[+count/mass]	[+human]
SOb	'all'	✓	✓	✓	✗
kOtok	'somewhat'	✓	✓	✗	✗
kichu	'some'	✓	✗	✗	✗
khanik	'a bit'	✓	✗	✗	✗
Olpek-	'a little'	✓	✗	✗	✗
prottek	'every other'	✓	✗	✗	✗
Onek	'a lot'	✓	✓	✓	✓
kOto	'how/so much'	✓	✓	✓	✓
Oto	'so much'	✓	✓	✓	✓
kOek	'a few'	✓	✗	✓	✓
numerals		✓	✗	✓	✓
num+Ek	'num or so'	✗	✗	✓	✓

On the one hand, it shows that since Num/Q-Cla is a compositional head, it is less of a closed class than its individual components but on the other, it also shows the relative restrictions on combinatorial possibilities.

Another criterion for a functional character of the complex is the lack of descriptive content. This holds as well for the complex as it does not pick out a class of objects (unlike demonstratives and possessives in Bangla) but elaborates some property of the complement noun. These two observations leads one to the conclusion that the complex may be a functional rather than a lexical head.

As pointed out at the end of section 1.1 the duality of status in terms of whether a particular head is lexical or functional makes the nature of the head in question semi-lexical. The last two sections showed that while Q-float and "agreement" make the complex lexical, its relative closed class properties and lack of descriptive content makes it functional. This ambiguity in its status confirms its semi-lexicality.

2. Zwicky criteria for headedness

The following five criteria discussed in Zwicky (1985) are taken up in the subsection 2.1-2.5. [12]

    (i)   Agreement
    (ii) Obligatory constituent
    (iii) Distributional Equivalence
    (iv) Subcategorisation
    (v)   Governor

In the following discussion, it will become clear that (ii) and (iii) are variants of each other[13] and that (iv) and (v) reduce to a single property when translated in terms of the concept of Merge within minimalism. However, whether reducible or not, these criteria establish the headedness of the Num/Q-Cla complex.

2.1. Agreement

Zwicky uses the phrase Determination of Concord for this criterion which I have simplified here as agreement. He claims that the dependent always triggers agreement on the head. This is to be found in languages with object agreement (thus the V is the head of the VP). He further distinguishes determinant of control from governor as follows. In both these cases, the morpho-syntactic features of one element determines those of another but

in the case of concord the same features are involved in both the determiner and the determinant.

Both Zwicky (1985) and Hudson (1987), who criticises and then re-defines many of the criteria formulated by the former, also talk of another generalisation that holds for agreement, namely, that agreement morphemes agree with NPs. In the case of verbs and adpositions, the NPs act as the argument of the predicate but with modifiers the NP is the constituent containing the modifier. Croft (1996: 40) shows that in some languages the genitive modifier agrees with the head (Serbo-Croatian) and in some the head agrees with the modifier (Mam). Hudson (1987: 116) argues that the relevant features in a NP are fixed independently by the semantics of the noun, the features, therefore, always spread from the noun.

In the context of Bangla, where agreement is not a pervasive clausal phenomenon (showing up only in person agreement), the shape of the classifier morpheme used in the DP can be considered as the only remnant of agreement, similar to the comments made at the end of section 1.2. Thus, in (17) below, the classifier chosen is determined by some feature of the noun; names of the classifiers are indicated in square brackets and the classifiers shown in boldface in the text:

(17) a. *du-**To***   *chele/ boi*   [General classifier]
         two-CLA   boy/ book
         'two boys/ books'

     b. *du-**jon***   *chele/ *boi*   [Human classifier]
         two-CLA   boy/ book

     c. *du-**khana***   **chele/ boi*   [Inanimate Count classifier]
         two-CLA   boy/book

Similar to the data set in (17) the classifier in Bangla can be shown to display number:

(18) a. *du-To*   *boi*
         two-CLA   book
         'two books'

     b. *dui-**dOl***   *hati*
         two-CLA   elephant
         'two groups of elephants'

    c.   *kOto-gulo   chele*
          so many-CLA boy
          'so many boys'
    d.   *Ek-gocha   phul*
          one-CLA   flower
          'a bunch of flowers'

If we consider that the noun selected (or the DP selected) has an abstract feature of plurality, then the classifier must be chosen accordingly. By Zwicky's definition, the classifier could be either the controller of concord or a governor (although Zwicky does not talk about Determiner + noun sequences for governor) but by Cann's (1993) formal definition this is a case of concord. This is also the case with Swedish where nouns are inherently marked for number and gender but the demonstratives/-determiners are marked morphologically.

    The Bangla example in (18) therefore exhibits co-variance by concord. Therefore by Zwicky's criterion, the Num/Q-Cla complex, whose form is altered in some sense in (18), is the Head on which the dependent noun triggers agreement.

2.2.   *Obligatory constituent*

By this criterion, the head should be the obligatory constituent in the unit. By implication, non-heads are optional. Thus *Peter played the game* or *Peter played* are fine since the verb is the head but not **Peter game*. Zwicky makes this criterion more restrictive by narrowing down the meaning of optionality: optionality that is due to ellipses is excluded from consideration. Thus in Swedish, the example (19b) is not considered for head determination since it involves an elliptical noun *one*. So the noun in (19b) is not optional and therefore D is not the head by this criterion. The adjective in (19c) is treated as a fully nominalised adjective as it has the narrow meaning typical of nominalised adjectives in Swedish. These considerations make the noun the head of the construction.

(19) a. *Dessa gamla kvinnor har det svårt*
         these old   women have it difficult
      b. *Dessa har det svårt*
         these have it difficult
      c. *Gamla har det svårt*
         old   have it difficult
      d. *Kvinnor har det svårt*
         women have it difficult   (Börjars 1998: 113)

In the following Bangla near equivalents of the Swedish example, the issue of ellipses is not relevant as the question of the demonstrative (not shown here) being a head or not is not relevant in the present context. See Bhattacharya (1999a) for a detailed discussion of the status of the demonstrative in the Bangla DP.

(20) a. *kOek-jon buRo lok aSbe*
         some-CLA old man come.3
      b. [$_{QP}$ *kOek-jon*] *aSbe*
      c. *[$_{NP}$ buRo lok] aSbe*
      d. *[$_{NP}$ lok] aSbe*[14]
      e. *[$_{ADJ}$ buRo] aSbe*[15]

The example above shows that without the obligatory presence of the whole complex (in this case *kOek-jon*), the supposed head, the constructions is unacceptable in the intended sense.

   Note that Hudson relates obligatoriness to subcategorisation by citing the following example:

(21) *I got two books but I didn't read either.*

In (21) *either* subcategorises for a zero noun and therefore (21) is acceptable without a complement following *either*. As far as Bangla is concerned, the data in (22) shows that only numeral/ quantifier and the classifier together can act as a head by this criterion:

(22) a. **du/ *To/ du-To*   *chele*
          two/ CLA/ two-CLA boy
          'two boys'
      b. **kO/ *jon/ kO-jon*   *chele*
          some/ CLA/some-CLA boy
          'some boys'

This leads us to the conclusion that both the constituents of the Num/Q-Cla complex count as obligatory for the purpose of head determination.

2.3. *Distributional Equivalence*

This Zwicky criterion states that a head is the constituent that belongs to a category with roughly the same distribution as the construct as a whole. This derives from 2.2 above since if the head is the obligatory constituent it is obvious that it will have *roughly*[16] the same distribution as the construct, and certainly more than the dependent. It must be pointed out that Zwicky himself rejects this criterion as a relevant one. But consider the following:

(23) a. *du-jon*   *chele khelo*
          two-CLA boy   ate
          'two boys ate.'
      b. *du-jon khelo*
          'two (persons) ate.'
      c. *?chele   khelo*
          'boy ate.'

Note that the example in (23c) has some crucial information lacking, therefore semantically it is anomalous. But *du-jon* (of (23b)) is distributionally equivalent to the whole QP and thus must be considered the head. Other examples, establishing the same point are given below.

(24) a. *Onek-gulo baMdor*
          a lot-CLA   monkey
          'a lot of monkeys'
      b. **Onek*[17]/ **gulo baMdor*

(25) a.   *SOb-gulo   chele*
          all-CLA   boy
          'all the boys'
     b.   **SOb/ *gulo   chele*

2.4.   Subcategorisation

The basic point about this criterion is that an element that requires a sub-
categorisation frame is a head and therefore this element needs to be listed
in the lexicon. For example, in a V+NP construction, V requires a subcat-
egorisation frame and is therefore the head. This requirement is satisfied by
the same examples as (17) and (18) above if we consider that the NPs are
selected by the Num/Q-Cla complex.

To elaborate further, consider the example in (18b) repeated below:

(26) *dui-dOl   hati*
      two-CLA   elephant
      'two groups of elephants'

As per the suggestion earlier, if we consider choosing a particular classifier
as an "agreement" morpheme on the complex then the fact that the noun
hati triggers agreement on the complex as a whole correctly predicts that
the complex is the head. Also, as per the subcategorisation criterion, it can
be shown that the noun *hati* cannot have a frame for the selection of the
classifier *dOl* since it can combine with many other modifiers:

(27) a.   *paMc-Ta   hati*
          five-CLA   elephant
     b.   *Onek-gulo hati*
          a lot-CLA   elephant
     c.   *kOek-Ta   hati*
          some-CLA elephant

On the other hand, the classifier *dOl* must have a requirement (and there-
fore a subcategorisation frame) that the complement noun be able to create
a collective. Since we have shown that the Cla is part of the complex, it is
possible then to claim that the complex is the head of the phrase.

However, according to Zwicky, the criteria of subcategorisation and
governor need to be related to the semantic functor status of the element in

question (and not its head status). In a way, this implies that an element can be the semantic head (*two boys* being types of boys rather than types of twos), but need not be the syntactic head. I am not sure if this argument can be transported to the domain of classifier expressions. For example, in (26) above, there is no rigorous way to tell whether the DP is about elephants or groups.

One way out of this impasse is to consider the criterion set up by Cann (1993). He argues that if two elements are related by agreement then they have the spec-head syntactic relation, on the other hand, if they take restricted complements (i.e. needs a subcategorisation frame) they have a head-complement relation. In the examples above, since there is no strict agreement relation between the complex and the noun in the conventional sense, the relation must be of head-complement rather than spec-head[18].

However, given the ambiguous nature of the applicability of this criterion, I suggest that this requirement, together with the next criterion (see 2.5), falls out of the way Merge operates. I will therefore recast example (18), which is a valid example for this criterion, in terms of Merge. It may be noted that the earlier contention (in section 2.1) that a semantic feature of noun derives the shape of the classifier, is not in conflict with the syntactic requirement of the Num/Q-Cla head to select an NP subcategorisation frame.

2.5. Governor

By this last criterion, the head of a construction is the constituent that governs the grammatical form of its sister constituent. Zwicky claims this to be different from subcategorisation as the form of the complement defined by government does not enter into semantic interpretation. Consider (28) in this connection. Cardinaletti and Giusti (1989) rule this out by suggesting that existential quantifiers assign partitive Case to their complements which cannot prepose to a subject position:

(28) *Children$_i$ are many t$_i$ noisy$\qquad$[It.]

This is based on the observation that in Italian a partitive clitic is allowed since the clitic is not moved to a Case assigning position:

(29) *Ne   ho   visti   molti*
     (I)   of-them saw   many
     'I saw many (of them).'

If this is true then it shows that the quantifier indeed determines the form of the complement (in terms of assigning partitive Case) - a task usually performed by the governor rather than the element that needs subcat-egorisation.[19]

    Given that in the minimalist framework there is no scope for a rule of lexical insertion based on subcategorisation frames, and because of the elimination of government as a grammatical concept, it is desirable to derive the criteria of subcategorisation and governor from some other source.

2.6.   Merge

Consider the fact that if a numeration N selected from the lexicon to construct a DP is (30), then a derivation as in (31a) crashes as the human classifier *jon* cannot be merged with a non-human noun; the derivation in (31b) which selects a human complement goes through:

(30)   N = {*du-jon* 'two-CLA', *boi* 'book', *chele-er* 'boy's'}

(31)   a.   {*du-jon, boi*}
        {*chele-er*, {*du-jon, boi*}}
        *<du-jon boi chele-er> or **<chele-er du-jon boi>*[20]
     b.   {*du-jon, chele-er*}
        {*boi*, {*du-jon, chele-er*}}
        <du-jon chele-er boi> or *<boi du-jon chele-er>*

A matching of features between the Num/Q-Cla complex and the following noun must be established for the derivation to proceed. Notice that a feature matching requirement for Merge is employed here. Let us see if that is a good strategy by itself.

    In the minimalist program, Merge is a basic operation (shown in (32)) whereby phrase structures are built up piece by piece as the computation proceeds.

(32)   Merge $(\alpha,\beta) = \{\alpha,\beta\}$

Given a pair of syntactic objects (α, β) which are selected from the Numeration, the operation 'Merge' constructs a new syntactic object out of the pair (α, β) creating a single syntactic object (K). The operation Merge (α, β) is asymmetric, projecting either α or β. The element which projects becomes the label of the complex. In general, the syntactic object K must be of the form $\{\gamma, \{\alpha, \beta\}\}$, where γ identifies the type to which K belongs. γ is called the label of K (not shown in (32) above).

Notice crucially that the order of the merged elements is irrelevant in this proposal. The notation $\{\alpha, \beta\}$ in (32) states precisely that. Collins (1997: 64) points out that this may not be sufficient as the operation fails to identify the head of the derived constituent. Collins rightly observes that the operation in (32) does not distinguish between segments and categories. Although finding the head is not an operation, Collins assumes that it is calculated automatically at the time the constituent is formed by Merge - one simply finds the head of one of the daughters. Consider the following derivation from Collins (1997: 64) to see this more clearly:

(33)   a.   Select V
       b.   Select N
       c.   Merge (N,V) = {N,V}
            Head ({N,V}) = V
       d.   Select Agr_o
       e.   Merge (Agr_o, {N,V}) = {Agr_o, {N,V}}
            Head ({Agr_o, {N,V}}) = Agr_o

If instead, at (33c), N was chosen as the head, at LF we would have an NP with a V complement. Collins concludes that it is reasonable to assume that the V will be uninterpretable at this position. Note that such an assumption rests on a grammar model with a look-ahead facility which is presumed to inflate the complexity of the computational component of the grammar.[21] However, Collins proposes a principle of *integration* which responds to this.

Consider the following partial derivation of *John left*:

(34)   a.   Select *John*
       b.   Select *left*
       c.   Merge (*John, left*) = {*John, left*}

The question that we have been trying to answer is what motivates the Merge in (34c). It is unlikely that a feature of either *John* or *left* is being checked through Merge. One possibility is that in selecting either of the two lexical items, a property of the lexical item concerned is being satisfied, namely, the property of being taken out of the Numeration (and consequently its associated integer reduced by one). This is rejected by Collins on the grounds that if two phrases (and not lexical items) are merged, no appeal to the Numeration is made.

He assumes the alternative that Merge of α and β, whether lexical or not, is driven on the basis of the fact that both must be integrated into the clause. He calls this trigger for Merge which involves no feature checking, Integration, and defines it as follows:

(35)   Every category (except the root) must be contained in another category.[22]   (Collins, 1997: 66)

Collins further points out that Integration is conceptually related to the LCA since if a phrase is not integrated into a clause, its terminals will not be ordered with respect to other terminals of the clause. One possible way of looking at this relation is that Integration follows from the Linear Correspondence Axiom (or the LCA) (Collins 1997: 69).[23] In Bhattacharya (1999a), I have adopted this view and considered the LCA as the trigger for Merge.[24]

Although I argue against a selectional approach to Merge in Bhattacharya (1999a), it is nevertheless possible to construct a case in its favour based on a recent monograph by Chomsky. Chomsky (1998) distinguishes between *set-Merge* for merger by substitution and *pair-Merge* for merger by adjunction. Adjunction is inherently asymmetric (X is adjoined to Y) and leaves the category adjoined to, unchanged. So pair-Merge of α to β will project the target β. Set-Merge as an operation is symmetric, so either label may project. The result is either interpretable at LF or not. Such a formulation implies look-ahead as part of the language design since Merge proceeds in the manner dictated by the success of the derivation at LF. I will rejected this approach since increasing the complexity of the computation is undesirable. Chomsky sees a way out of this.

Set-Merge also has an inherent asymmetry since α, β merge in order to satisfy selectional requirements of one of them (the *selector*) but not both. Chomsky observes that the selector is *uniquely* determined (emphasis mine). In particular he opts for a featural account for Merge triggers. A feature F of one of the merged elements in $\{\alpha, \beta\}$ must be satisfied for the

operation to take place. F is in the label of the selector and the label of the selector projects.

Chomsky does not say which is the selector but I assume that the head is the selector. Since we have already proposed LCA as the trigger for Merge, the first Merge is decidedly {head, complement}. In conclusion, in the case of the asymmetric operation pair-Merge there is no selector whereas set-Merge has a unique and obligatory selector which determines the label of the construction.

Although many questions remain unanswered, it is nevertheless possible to derive the criteria of subcategorisation and governor from this feature matching requirement of Merge.

3. Syntactic Evidence for the Semi-Lexicality of the Num/Q-Cla Complex[25]

In this section, I will provide some syntactic reasons for the complex headedness status of Num/Q-Cla. Recall from section 1, that according to Emonds (1985), one of the properties of semi-lexical heads is that they do not expand. In the context of the Num/Q-Cla complex, I have interpreted this as implying the impossibility of splitting up of the complex. In this section, I will first consider splitting up the complex head and show that it cannot be done for some well-formed syntactic reasons.

3.1. *Data on All and Non-All Quantifiers (NAQ)*

Notice first the behaviour of the quantifier *SOb* 'all' in the following pair:

(36)   a.   *SOb gulo chele aSbe*
             all   CLA boy come.FUT
             'All the boys will come.'
      b.   *SOb chele gulo aSbe*
             all   boy CLA come.FUT
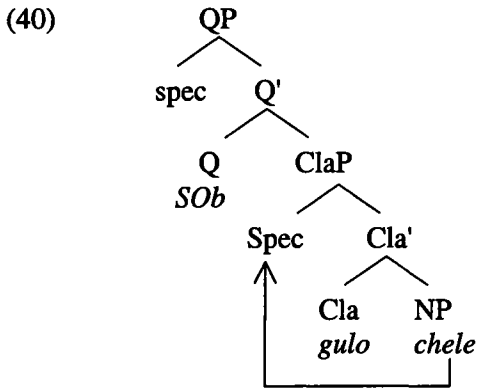   'all the boys will come.'

The difference between the two is that in (36b) *SOb* 'all' quantifies over a particular set of boys, a set which has a prior discourse reference. (36a) on the other hand is a quantification over an exhaustive set of boys. Additionally, (36b) shows, for the first time, that an NP can appear between Q and Cla. This would suggest that these two ought to be split up into two heads and that unlike *-Ta*, the classifier *gulo* does not cliticise to the Num/Q. Before making any proposals, let us look at quantifiers other than *all*, which I identify, for purely mnemonic reasons, as non-*all* quantifiers (NAQs):

(37) a. *Onek   gulo   chele aSbe*
          a lot   CLA   boy   come.FUT
          'a lot of boys will come.'
      b. **Onek   chele gulo   aSbe*

(38) a. *kOtok   gulo   chele aSbe*
          some   CLA   boy   come.FUT
          'some boys will come.'
      b. **kOtok chele gulo   aSbe*

That is, in the case of NAQs, the leftward NP movement is disallowed. Recall that in connection with the data in (14) it was pointed out that the type of NP movement that (14) depicted involves topicalisation and is not the topic of discussion in this paper. Rather, the type of NP movement dealt with in this section are of the type shown in (39a) below where the NP moves *between* the Q and Cla rather than moving to some distant and outer spec position. This latter type of movement is probably triggered by some sort of a topicalisation feature.
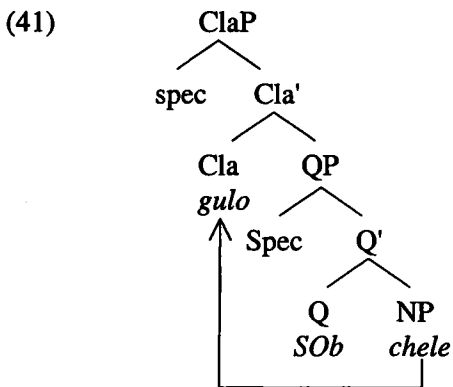
(39) a. $[_{QP} \text{ Q CLA}]$ NP $\rightarrow$ $[_{QP} \text{ Q NP}_i \text{ CLA}]$ t_i
      b. $[_{QP} \text{ Q CLA}]$ NP $\rightarrow$ $\text{NP}_i ... [_{QP} \text{ Q CLA}]$ t_i

The same pattern of NAQs as in (37) and (38) as above is obtained with other classifiers and quantifiers. One possibility of accommodating the above data is by splitting the Num/Q-Cla into two separate heads Q and Cla:

(40)

```
           QP
          /  \
      spec    Q'
             /  \
            Q    ClaP
           SOb   /  \
             Spec    Cla'
              ↑      /  \
              |    Cla    NP
              |   gulo   chele
              |_____|
```

The movement of the NP to [Spec,ClaP] would derive the order in (36b) whereas no movement is necessary for (36a). However, the above derivation is incorrect for at least three reasons:

(i) Given the reasons for the headedness of the Num/Q-Cla complex and given the data in (37) and (38) above, it is likely that the Num/Q-Cla sequence is formed through head adjunction of Q and Cla. If that is the case then the derivation in (40) would give us the wrong order of [Cla-Q]. This is based on the reasoning that adjunction is always to the left. Although there are proposals in the literature in favour of a right adjunction at the word level, I will consider adjunction as always to the left for uniformity of analysis without committing myself one way or the other whether these movements are part of morphology or syntax. So the revised structure is as follows:

(41)

```
           ClaP
          /   \
      spec     Cla'
              /   \
            Cla    QP
            gulo   /  \
              ↑  Spec    Q'
              |         /  \
              |        Q    NP
              |       SOb  chele
              |_____|
```

This is the derivation for (36a) achieved through head adjunction of Q to Cla, but not (36b). One sensible possibility is to move the whole QP to [Spec,ClaP]. This will however not stop the derivation of the unwanted (37b) and (38b):

(42)   *[$_{ClaP}$ [$_{QP}$ *Onek* [$_{NP}$ *chele*]] *gulo* t$_{QP}$]

Secondly, this would imply that a feature of the Cla is responsible for the movement of the QP to its spec. This is not true since using any other classifier in place *gulo* in (37) and (38) would produce the same ungrammaticality. Based on these observations, I reject the head analysis of *SOb*.

(ii) The structure in (40) cannot explain why the NP does not move in the case of NAQs. A closer inspection of the make-up of the quantifiers in the NAQ group reveals that all of them contain some indivisible version of the word for *Ek* 'one', at times morphologically unrecognisable:[26]

(43)   a.   *Onek*   'a lot'
       b.   *kOek*   'a few'
       c.   *khanik*   'a bit'
       d.   *Olpek*   'a little'
       e.   *prottek*   'each one'
       f.   *kOtok*[27] 'a few'

I call this morpheme *Vague-one* since it gives a vague meaning to the numeral. The presence of this morpheme in some form bars the possibility of moving an NP between the Num/Q and the Cla. Thus, some feature of the quantifier decides on the NP movement noticed in (36b) and the lack of it in (37) and (38).

(iii) The most serious problem with the derivation in (40) is its inability to distinguish between the two classes of quantifiers both of which are identified as Q heads in this structure. The difference between *all* and other quantifiers is well-established in the literature (e.g. Shlonsky (1991) for Hebrew, Giusti (1991, 1995) for Italian, among others).[28] In connection with Bangla, one difference in their morphological make-up is immediately clear if we consider *SOb* in relation to the data in (43). *SOb* does not carry either a hidden or visible counterpart of the Vague-one morpheme shown in (43).[29] Based on the discussion in this section, I conclude that *SOb* is an XP and is base-generated at [Spec,QP].
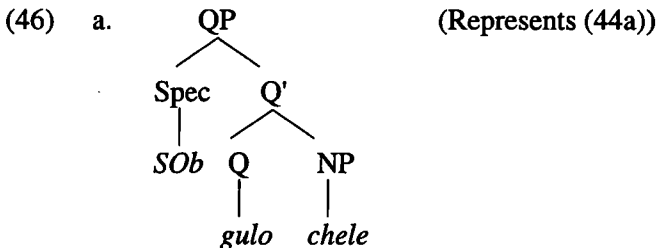
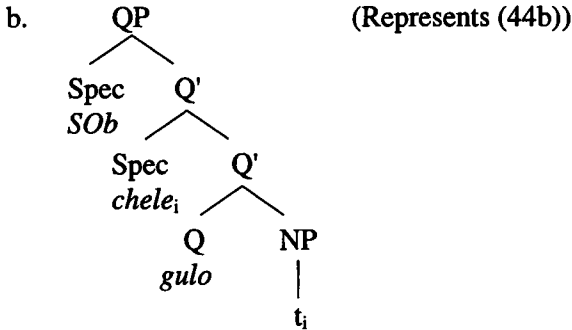### 3.2. Revisiting the relevant data: back to Q and Cla as a fused head

Armed with the conclusion from the preceding section let us look at the relevant data presented in section 3.1 again.

(44) a. *SOb gulo chele aSbe*
          all   CLA   boy   come.FUT
          'All the boys will come.'
      b. *SOb chele gulo aSbe*
          all   boy   CLA   come.FUT
          'all the boys will come.'

(45) a. *Onek   gulo chele aSbe*
          a lot   CLA   boy   come.FUT
          'a lot of boys will come.'
      b. **Onek   chele gulo aSbe*

It is clear from this data that *SOb* is different from NAQs in allowing the NP to appear between it and the classifier. Now with the conclusion that *SOb* is indeed different, I claim that the structure of the Bangla DP where the middle layer is a complex head (represented by) Q has a natural way of accommodating the data related to *SOb*. That is, the Q and the Cla should *not* be split into two separate heads. The headedness of the Num/Q-Cla, therefore, stands. The derivation for (44) (=(36)) (minus the verb) is shown in (46). Note that the Q in (46) hosts the classifier *gulo*. This need not be confusing since the Q node is a complex node demonstrated in this section as being Q+Cla internally, and since the internal Q is empty in this example, the only remaining element under the complex head Q must be the classifier.

(46) a.   QP   (Represents (44a))
               /   \
            Spec   Q'
             | / \
            SOb   Q   NP
                  | |
                 gulo chele

b.   QP   (Represents (44b))

```
b.         QP                    (Represents (44b))
          /\
       Spec   Q'
       SOb   /\
          Spec    Q'
         chele_i  /\
               Q    NP
             gulo   |
                    t_i
```
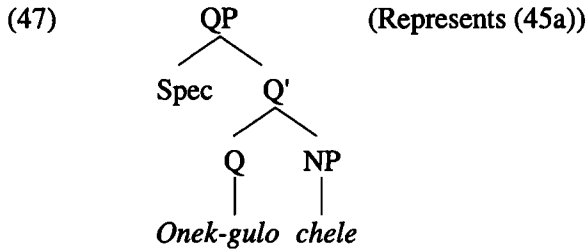
Apart from the fact that we do not require another head for the classifier, this analysis is desirable on three counts:

(i) Note that the derivation in (46b) exhibits leftward NP movement inside the DP. This has been claimed to be the major thread of discovery in Bhattacharya (1998a et seq). The analysis of *SOb* therefore provides additional evidence towards this demonstration.

(ii) Notice that the derivation in (46b) crucially depends on the availability of multiple specifiers. I claim that this is expected (a) given the minimalist framework adopted for this study and (b) confirms a crucial principle proposed in Bhattacharya (1999c), *Tuck-in*, based on Richards (1997) which predicts that later XP movements target inner specifiers.

(iii) The analysis in (46b) provides an elegant solution to the puzzle of NAQs. Note that in (45b) (similarly for other NAQs) the NAQ *Onek* does not allow the leftward NP movement noticed with *SOb*. Recall one of the differences between the two types of quantifiers elaborated in section 3.1. NAQs were shown to embed a special morpheme *-Ek* 'one' which was missing in *SOb*. The analysis in (46b) has a natural way of incorporating the connection between this morphological observation and the lack of NP movement in NAQs as follows.

DP-internal NP movement in Bangla is due to the presence of a feature of [SPECIFICITY] on the (complex) Q head. Similarly, the NP movement shown in (46b) above is also due to such a feature of the Q. In the case of NAQs, the *-Ek* morpheme makes the Q head non-specific. This is not unlikely, given that (at least) the Vague-one morpheme makes the meaning vague or non-specific. The derivation for NAQs, therefore proceeds as follows:

(47) QP (Represents (45a))

```
            QP
           /  \
        Spec   Q'
              /  \
             Q    NP
             |    |
         Onek-gulo chele
```

The NP cannot move up because there is no attractor feature in Q.

4.   Conclusion

The sequence of the quantifier or the numeral followed by the classifier in Bangla is shown to behave like one unit. This behaviour is most pronounced descriptively, as shown in sections 1 and 2, and syntactically (section 3). Based on the criteria for semi-lexicality or the disguised nature of certain categories in Emonds (1985), it was shown that the complex is one such category. Furthermore, based on certain (revised) criteria of head determination in Zwicky (1985), it was shown that this complex indeed behaves as a head. Lastly, section 3 extended Emond's (1985) argument with respect to the expansion of a category in the realm of syntactic movement and concluded that for well-defined syntactic reasons the complex although morphologically visible as being composed of a Num/Q plus a Cla, cannot be further split into a Q and a Cla for the purpose of syntax.

Notes

1. I am thankful to Misi Brody, Ad Neeleman, Andrew Simpson and Neil Smith for comments and criticism of an earlier version of the paper and to the participants in the Semi-Lexical heads Workshop at Tilburg, in particular, to Norbert Corver and Elizabeth Löbel for comments and questions. Thanks also to an anonymous referee for raising some points which led to useful revisions.
2. For a general introduction to the language and its name, see Bhattacharya (forthcoming).
3. The transcription works as follows: T D R = Retroflex /ʈ ɖ ɽ/; S = Palato-alveolar /ʃ/; N = Velar /ŋ/; = E O mid vowels /æ ɔ/; M indicates Nasaḷisation.
4. This is a case of Kinship Inversion (Bhattacharya 1998b) involving the *affectionate* classifier allomorph -*Ti* (also see (1c)).

5. However, consider the following counter-examples:
   (i) *tin peala   ca*
       three cup   tea
       'three cup tea'
   (ii) *kOto   lok!*
       some people
       'so many people!'
   However, (i) is more like a measure phrase and less of a quantified expression. Similarly for (ii), as noted in connection with example (24), although classifier-less quantified DPs are more common than quantifier-less classified DPs, the former also has restricted and special uses (to form an exclamative in (ii) above). I will therefore consider these as marginal cases and not as the norm.

6. Although I finally conclude that *all* in Bangla is not a quantifier head but is an XP.

7. This space is identified as the middle layer in a three-layered DP structure in Bhattacharya (1998a, 1998b, 1999a, 1999b).

8. Emonds (1987) expressed similar views in his Invisible Category Principle which states that *bright-er* expresses inflectionally what *more bright* expresses in terms of a separate word. The pair **(the) bad student* (count) versus *bad students* makes the same point that if a noun is capable of expressing plurality, in the case of count nouns, it is expressed as an inherent syntactic feature which constitutes a functional projection.

9. Note that the two orders have different specificity/definiteness reading. This fact is captured in the translation with the partitive/specific reading indicated within parentheses.

10. However, in section 3.2 it will be shown that quantifiers like *kO* do not indeed allow NP movement. The type of NP movement shown here must be distinguished from the NP movement of the sort analysed in section 3.2. It will become clear from the analysis in section 3 that I will be concerned with the latter type of NP movement which moves an NP to the specifier of the QP under discussion. The NP movement shown in (14) is of a topicalised variety. The most correct translation of (14) would therefore be 'as for the boys, there were some/ two'. This movement has been discussed to some extent in Sahoo (1999) for Oriya.

11. Recall in this connection that Bhattacharya (1995) and Bhattacharya and Dasgupta (1996) (mentioned in section 1) proposed a parameter between Hindi and Bangla which demonstrates the correspondence between the classifier of the Class languages and the gender/ number marking of the Gender languages.

12. Zwicky also discusses morpho-syntactic locus as another criterion by which an element bearing the mopho-syntactic markers which enable the constituent to link to a bigger constituent is identified as the head. However, in the context of DP-internal material in a language without agreement, it is difficult to see the usefulness of such a criterion and I will, therefore, keep it out of the discussion. It has also been extensively argued (see Börjars 1998 for a review)

that Zwicky's criterion of Functor and Argument cannot decide headedness one way or the other.

13. See Hudson (1987) for a similar argument.

14. This example is unacceptable in the intended sense, i.e., where the meaning intended is about the coming of a particular old man. The expression on its own is fine as an answer to a question.

15. If however *buRo* here is used as a proper name then this expression is acceptable.

16. See Croft (1996: 37) for questioning the use of this term (and other criteria of Zwicky) and for suggesting an alternative.

17. A classifier-less quantifier is apparently "more" acceptable as opposed to a quantifier-less classifier. However, the contexts under which this is true are identifiable as definite/specific or at least discourse anaphoric (e.g. in answer to a question). This restriction on the context can be read as the presence of an underlying classifier. Additionally, Quantifier+NP can also be used to make an exclamative or a generic existential or possession, making such uses as special cases. However, I leave the discussion of this possibility for future research.

18. Note that his observation is also in line with minimalist theory of agreement as checking between a specifier and a head. By the extension of agreement implied (as "agreement") in this paper, we can consider head-complement relation as establishing this latter extended version of agreement. However, given the speculative nature of this suggestion, a separate discussion of this possibility must be postponed to a later occasion.

19. As mentioned earlier, in Bangla however there is no restriction on NP movement across the Q head as long there is a classifier with a particular feature ([SPECIFICITY]).

20. Both orders may be produced depending on whether there is Move after the first Merge, I have ignored various details which are not relevant for the point being made.

21. See Chomsky (1998) for some relevant discussion on this point.

22. The problem with the definition of root (a category not contained within any other category) is not addressed in Collins. Without such a definition, Integration as stated above is not meaningful. One possible line of approach in defining the root could be in terms of look-ahead. If we say that the grammar needs look-ahead of some variety, contrary to the attempt in Chomsky (1998) of eliminating it, root could be the point where there is no more look-ahead. The asymmetry in Chomsky (1998) pointed out in Bhattacharya (1999a) regarding the reduction of complexity, indicates the possibility of incorporating a certain amount of look-ahead in the grammar.

23. In Collins (1997) he rejects this possibility based on the status and position of the Linear Correspondence Axiom (or LCA) discussed in Chomsky (1994). However, since the conceptual relation between Integration and LCA remains and because Collins (1997: 137) himself suggests the possibility of reducing

Integration to LCA, perhaps it is likely that some form of LCA is responsible for Integration and therefore, Merge.

24. See, however, Uriagareka (1997) which derives LCA from basic minimalist assumptions.

25. The evidence presented in this section is discussed at a greater length in Bhattacharya (2000).

26. Notice the English glosses suggest a similar presence of *one*.

27. In quantifiers without a visible *-ek* morpheme, we get either a reduced Wh-word (K-word) as in (ia,b) or a demonstrative particle (ic) in front:

(i) a. *kichu* 'some'
     b. *kOto* 'how/so many'
     c. *Oto* 'so many'

It is possible that all these indivisible particles contribute to the featural makeup of the Q head contributing towards a general notion of counting or enumeration. However, I have no idea if this connection between the *-ek* set and (i) is a robust one or whether it can be stated formally.

28. In English too, this difference is reflected in the following minimal pairs:

(i) a. *All the boys*
     b. **The all boys*
(ii) a. **Many the boys*
     b. *The many boys*

See Abney (1987) and Szabolcsi (1987) for some relevant discussion.

29. In discussions by Shlonsky and Giusti on the phenomenon, it has been suggested that the QP embeds the DP. However, there is no evidence in Bangla to consider Qs as external to the DP. In particular, the demonstrative and the possessive which are independently shown to be higher specifiers of the DP in Bangla, always *precede SOb*:

(i) a. *ei   SOb   gulo   chele*
         this   all   CLA   boy
         'all the boys here'
     b. *amar SOb   gulo   chele*
         my   all   CLA   boy
         'all my sons'

See Bhattacharya (2000) for further evidence.

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