

Butterpillar or Caterfly?

The Bangla Passive in a Minimalist Parser

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Abstract

This paper teases out the dynamic character of the usually docile passive construction in Bangla by proposing first that the passive template historically is a result of a certain tension within the body of the clause that can be captured more than adequately using the general principles (like incorporation, verb-shell configuration, “smuggling”, etc.) of the Principles and Parameters framework. Secondly, it is shown that the structural characteristics of the passive invite a computational treatment that emphasizes the basic intuitions of a Minimalist Parser based on the Probe-Goal mechanism of Minimalism. However, in order to make it implementable, a straightforward borrowing of the syntactic analysis into such a parsing algorithm is shown not to work.

1 The Place of Passive in the P&P frameworks

Later GB (Government and Binding Theory as explicated in Chomsky, 1981) achieved a severance between the active and the passive form of a sentence to a certain degree. This de-linking – in terms of early Minimalism (as in Chomsky, 1995) – implies that actives and passives have different derivational histories.

This rethinking of the traditional deep connection between the active and the passive is partly motivated by the problem of irrecoverability of meaning across the two construction types. In other words, the interpretive difference of the passive version from the active goes against the syntactic attempt to derive the former from the latter.

However this reworking also misses a generalization. This has to do with how we think of a passive expression. It seems to be difficult to think of a passive out of the blue. Compare the case of passives with questions. Although questions are derived from assertions, they seem to have a life of their own. Thus, although questions and (at least the traditional derivation of) passives are comparable in the sense that both are ‘secondary’, it is surprising that syntactic theories always treated questions as derived through movement and passives, at least in late GB and Minimalism, as independent derivations.

The generalization that this independence misses, as mentioned above, crucially has to do with how we think of passives. A passive sentence is more than just a pure flowering of thought, it is more “surfacey” than the initiation of a derivation from speaker’s intention.

Is there a way to capture this dilemma within Minimalism? I think there is.

2 Evaluation Matrix and the Passive

An evaluation matrix in Minimalism necessarily comprises of the various Economy Principles. Some of these principles like *Least Effort*, can be seen to be operative in the realm of some of the well-known cases like V-movement in French and Auxiliary movement in English, among others. For the latter, *do*-insertion invokes yet another economy principle/ condition known as the *Last Resort*, that is, apply the least costly UG principle, if possible, rather than a language specific one.¹

Derivations that we can compare for evaluating any measure of economy, are further restricted to the *convergent* ones. Take for instance the derivations that yield the structures in (1):

¹ The relevant discussion can be found around p134 of Chomsky (1995)

- (1) a. * $[_{TP}$ seems [John to be the smartest student]]
 b. [John_i seems [t_i to be the smartest student]]

If economy was computed by counting the number of steps, the derivation of (1a) should wrongly block the derivation of (1b), which involves an additional operation of movement. However, if economy is considered by evaluating only convergent derivations, then the derivation of (1a) does not count for the evaluation of economy, since the strong D-feature of T (= the EPP feature) remains unchecked, causing the derivation to *crash* at PF.

In connection with the case in hand, I would like to think that at some point (perhaps at the ‘superficial’ point), in any rate, before the evaluation matrix comes into play, the passive/ active are comparable derivations. It is only later that the passive ‘wins out’.

It must also be pointed out that this particular situation obtains only in the case of the passive. That is, only if the speaker’s intention (a ‘pre-Numeration’ state, see Bhattacharya 2001a on this) to begin with, had ‘dethematicization of subject’, that triggers the two separate derivations, as an encoded intention.

This hypothesis will achieve at least two things for us: (i) it will provide an evidence for the plausibility of two derivations out of one Numeration Set (N)², and (ii) it will not compromise the basic intuition of the traditional connection between the active and the passive and at the same time it will avoid the pitfalls of taking this connection too seriously. In effect, thus, the connection between the active and the passive is maintained in the Minimalism model *until* the evaluation matrix comes into force.

The ‘Superficiality’ of the passive alluded to above is a consequence of the functionality of the construction (or strategy) which is rather different from that of the interrogative. The passive invariably feels like a distinct strategy – not the initial ‘triggering of thought’ that is conceivably connected with the speaker’s intention – and therefore must be somehow later. The issue to resolve with respect to the possibility (i) above thus is whether ‘later’ implies giving up of the derivation and thinking (therefore computing) anew or readjustment in the existing derivation.

This calls for reopening the debate over the sanctity of the Numeration set (by which I mean the Inclusiveness Condition as seen in connection with the status of the Numeration set) within the Minimalist Program but is beyond the scope of the present paper. However, it may be pointed out that the GB version of passive necessarily viewed passive involving *addition* of the passive morpheme in the syntax (see for example, Baker 1988, Jaeggli 1986 and Áfarli 1992). This would imply that a passive and its active version are both derived from the same underlying representation. Thus, (2a) projects into syntax with arguments as in (2b) to produce an active sentence, whereas (3) shows the derivation of the passive counterpart:

- (2) a. *kill*, V: ag, pat
 b. [_{VP} NP [*kill* NP]]
 (3) a. *kill*, V: ag, pat
 b. [_{VP} __ [*kill* + PASS NP]]

However, in similar vain as above, trying to determine the temporal positioning of the erstwhile D-structure in relation to the current, Numeration set, is closely related to the concern expressed in this section but will take us too far from the main theme of the present paper.

3 The Passive in Bangla³

The passive in Bangla is very prolific. A cursory look at any corpus at random would throw up innumerable passive forms in the text, yet there are a very few syntactic analysis of passive in Bangla, a situation that prevails across languages. Thus, a modern syntactic analysis is urgently required, the inspiration to investigate this construction syntactically first, as I do in this and following three sections.

Bangla does not have an inflected passive. The analytical or periphrastic passive is usually formed by the passive participle affix *-a* and the auxiliary verb *ja* ‘to go’ although a proper passive voice with a nominative object is not natural in the language. As in English where the passive is formed by *-en*

² There are issues of code-mixing and the bilingual mental lexicon that are intricately connected with this which are beyond the scope of the present paper, but see Bhattacharya (2003) on this.

³ Most of the material presented in this section draws on Bhattacharya (2001b)

and the *be* verb, Bangla uses *-a* and *ja*, like English, a *be* verb shows up necessarily. The *ja*-passive forms an impersonal construction,⁴ e.g., with the verb ‘to see’:

- (4) dEkh-a jay
see-pass go.3
‘it is seen.’

If a promoted object is used, it is in the Dative:

- (5) ama-ke dEkha jay
I.obl-dat see-pass go.3
‘I am seen’
(= to me is seen)

The DAT is used here because of the use of the DAT in the base sentence:

- (6) Se ama-ke dEkheche
s/he I.obl-dat see.ppl.3
‘S/he has seen me.’

If the agent of the active is expressed, it is, again like familiar languages, followed by the postposition *dara* ‘by’:

- (7) jim dara bagh-Ta mar-a gEche
Jim by tiger-cla kill-pass go.ppl.3
‘The tiger was killed by Jim.’

A few cases of idiomatic passive formation take place with the verb *pOr* ‘to fall’, *gElo* ‘went’ *cal* ‘to go’, *hOy* ‘to happen’ etc. instead of *ja*:

- (8) a. mar-a pOre
hit-pass fall.3
‘gets killed’
b. mar-a gElo
hit-pass went.3
‘got killed’
c. kha-wa cOle
eat-pass walk.3
‘can be eaten’
d. ama-ke dEkh-a hOy
I-dat see-pass be
‘I am seen’ (=she/They see me)

The oldest form of Bangla used the *-On* suffix (instead of the *-a*) which is lost now but is preserved in some East Bangla dialects. A recent passive form with the auxiliary *ach* is also available for inanimate nouns:

- (9) e boi amar pOr-a be.3
this book my read-pass ache
‘this book has been read by me.’

Sometimes the impersonal passive is employed for politeness when the use of a particular pronominal form can be avoided:

- (10) ki kOr-a hOy
what do-pass be.3
‘What is done (by you)
= What do you do?’

Thus we see that the passive in Bangla generally employs the template [(NP *by*) NP V-*a beV*] where *beV* indicates the *be* form of the verb that necessarily appears with the passive.

3.1 The Passive-Gerund Similarity

In connection with (7), it must be noted that it is equally possible to use the GENITIVE with the agent, more so if the agent is not a proper noun:

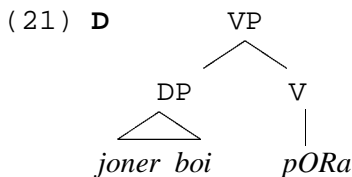
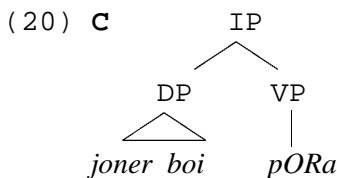
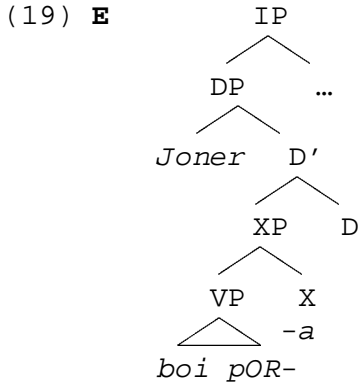
⁴ Typically impersonal passives are passives with an expletive subject; in languages without an expletive, the agent is suppressed.

If we simply set up the rule that if two nouns are encountered then the V is not going to be PASS anymore, or, if we set up the rule that if GEN is encountered then a GERUND will be generated, we will run into a problem as follows.

For (15b), (a) can trigger:

- (i) a GERUND → Parse **E**
- (ii) a POSS DP → Parse **C** or **D**

The structures of the possible parses for these two possibilities are shown below, where, for tree **E**, the gerund projection is kept unlabelled as an XP, assuming that the traditional label for it is IP but it need not be the case (Bhattacharya 1999).



If we go by (ii), when *pORa* is encountered the two possible parses **C** and **D** are given up and the parser backtracks to (i) to analyze it as a GERUND. However, when an expected noun is not encountered after *pORa*, first, a pro is posited and an IP is projected. Then, when *hoeche* is encountered (see (15a)), the parse **E** is given up. That is, when a light (*be*) verb instead of a full verb is encountered, the parse is rejected. The question is, what happens next since both possibilities (i and ii) are rejected.

At this point, one has to resolve the true nature of the construction in (15b), is it a passive, a gerund or a mix of both? Let us consider a similar pair:

- (22) a. (jOn dara) bagh mara gEche
 John by tiger kill.pass go.ppl.3
 'a tiger has been killed by John.'
- b. joner bagh mara gEche
 John.gen tiger killed go.ppl.3
 'John's tiger has been killed.'

Since (22b) is unambiguously a passive with a possessive Theme DP, the earlier algorithm for (15b), (i) and (ii), must be revised. Notice that even in the case of (15b), the non-salient reading, 'Someone has read John's book' could not be recovered if the given algorithm is followed, since that particular interpretation is dependent on the POSS-DP analysis of *JOner boi* 'John's book'.

So in the case of (22b) the POSS-DP parse must proceed even after an *-a* marked verb is encountered. Here the *-a* marked verb can unambiguously project a passive Elementary Tree (ET, see section 6 for further details) where the DP [*JOner bagh*] is in [Spec, T] and the verb *mar*a selects for an unergative vP *gEche*.

So the problem with (22b) is that we can get the POSS-DP meaning and the passive structure when the *be* verb is *gEche* but not when it is *hoeche*. Consider the following:

- (23) a. [jOner bagh] mara hoeche
 J.gen tiger killed be.ppl.3
 ‘John’s tiger has been killed.’
 b. jOner [bagh mara] hoeche
 ‘John’s killing of the tiger has happened.’

The ambiguity shown here is similar to the one in (15b). It is not the case that *ho* does not project a passive structure, since (15a) is clearly a passive. What seems to be the case is that if the NP is GENITIVE and the light verb is *ho* then the passive does not project.

Let us consider the following sequence of steps for these types of inputs:

- (24) i. [joner bagh]
 ii. + mara
 A: GER expects N/∅ and main V
 B: PASS expects LV
 iii. + *gEche*
 C: rejects (iiA)
 D: proceeds as PASS
 OR, If
 iii. + *hoeche*
 then apply R1
 R1: [NP+GEN... a]-> no PASS
 iv. reject (iiB)
 v. → GER tree projected

Apart from the extra rule stipulation, this algorithm cannot generate the meaning of (23a). So we need to revise the algorithm further. Suppose we say that at step (iiB), there are two possible ETs:

- (25) ii. + mara
 A: as before
 B1: [joner bagh] ∅ mara
 B2: :[joner bagh]DAT mara
 iii. + *gEche*
 C: rejects (iiA)
 D: proceeds with B
 d1: rejects B1, apply R2: *gEche* takes NOM
 d2: accept B2
 OR
 iii. + *hoeche*
 E: accept A →
 generates (23b)
 F: reject B

However, this algorithm will run into a similar problem as it will not give us the parse for (23a). So, we will need another Rule, R3:

The [DAT] Rule

ho can take NP-NOM at [Spec,T] and NP-DAT at [Spec,v]

Now, step (iii) above becomes:

- (iii) + *hoeche*
 E: accepts A → GER
 F: rejects B1
 G: accepts B2 → apply R3 → PASS (23b)

In this demonstration we needed at least three ad hoc rules to resolve the ambiguity between the gerundial and the passive meaning. Such construction specific rules make the grammar formalism cumbersome. In what follows, we will see how if a parser based on the core properties of Minimalism, namely, Probe-Goal, Agree can address this problem more efficiently. First, though, further insights into the structure of the passive in Bangla can be obtained if we look at the history of such constructions.

5 Butterpillar/ Caterfly: The true nature of the Bangla passive

Dethroning the agent of its agency seems to be the dominant functional reason for selecting the passive derivation, given that other well-known diagnostics do not hold across the world's languages. However, this dethroning seems not to strip the external argument (EA) completely of its agent properties (binding, control, etc.). Early thinking on the passive with respect to the demotion of the passive agent seems to be a surface phenomenon indicating the adjoined status of the agent. This tension with regards to the demotion of the EA led to a near silence on the topic of the θ -role of the EA; the ad hoc mechanism of θ -role transmission is thus employed in the GB account of passives (e.g., Jaeggli 1986) to save the account. What we take from this discussion is that passive is not about de-thematicization of the EA but rather a suppression of its agency.

One way of clipping the powers of a sentence is to conflate a sentence into a nominal structure. Thus the celebrated DP Hypothesis of Abney (1987), although is an account to highlight the similarity between a clause and an NP, seen in this light, implies that the EA of the sentence, remaining though the notional SUBJECT within the DP for binding purposes, is no longer in possession of its earlier powers. Thus an NP can be seen as a condensed form of the sentential energy. The metaphoric title of this paper hints at this trapped energy; the caterpillar is waiting to burst open into a butterfly.

Though that may be the conventional, sequential way nature works (in some cases), the opposite alternative is equally feasible if for a moment we think of this as an objective system of signs. That is, this state of affairs can be viewed with equal legitimacy as the butterfly shrinking into a caterpillar, running of the film backwards, if you like. I would like to show that both these possibilities are captured in the structure of the Bangla passive. On the one hand, the suppression of the energy of the EA is achieved by clipping the wings of the butterfly and on the other hand, the history and the synchronic syntax suggest that a part of the passive body is waiting to be released as a butterfly. I will term the first as $B \rightarrow C$ strategy and the second as $C \rightarrow B$ strategy.

5.1 History of the Bangla Passive⁵

Historically, the Bangla passive morphology (-a) is derived from the denominative (-aya) which is often, in the history of its development, obscured by the causative -aw. The denominative is visible in the following contemporary forms:

- (26) a. daMR 'stick' >
 daMRay 'stands'
 b. tOl 'bottom' >
 tOlal 'goes to the bottom'

Later on, the causative influenced and encroached upon of the denominative, so much so, that the distinction is lost in the modern language.

Note that both these historical processes are attempts to verbalize, changing the N into a V (denominative) and adding yet another verbal affix to a verb (causative). Surprisingly, both of these processes find analogues in the modern syntactic theory. Thus incorporation (Baker 1988) of an empty head into the N and then the amalgamated head incorporating again into a verbal head to bring upon the changed from, let us say, *shelf* (N) to *shelve* (V) in Hale and Keyser (1993). On the other hand, in a not too different a fashion, head movement of the V into the functional head small *v* is seen in most versions of Minimalism to account for causativization. The English form *feed* may be seen as an example par excellence of both the strategies coming together.

The historical derivation and the syntactic analysis of the source of the passive suggest that at least a part of the body of the passive shows sure verbalization signs – in terms of the metaphor, sentential energy waiting to be released; in short, the $C \rightarrow B$ strategy. In terms of a syntactic derivation, this should then be captured in bringing to the surface the small *v* head of the verbal projection. I will shortly suggest that there are essentially two ways to look at the realization of *v* in syntax.

5.2 History of the Passive Agent

Tracing the historical antecedent of the agent phrase of the passive is far trickier than that of the predicate. It starts with the IE prepositions being first adverbials but later coming to be attached to particu-

⁵ Most of the material in this section is gleaned from Chatterji (1926).

lar Case forms of the N (like ACC, INST, ABL, GEN, LOC). In IA the use of postpositions (P) to Case relations is common in Munda and Dravidian. In MIA, when the case inflections were being lost, the P acquired ACC, DAT, ABL, or LOC of some nouns along with the main noun with its own affixes. Classical Sanskrit took this up and extended the postpositional use to some verbal forms – passive participle, present participle and indeclinable conjugative verbs. Other IE languages also show P forms of verbs, but to a limited extent, for example, ‘during’, ‘concerning’, ‘regarding’, etc. In IA such extensions to verbal forms were fully employed, influenced, according to Chatterji (1926), by Dravidian. Some of these Ps (now nouns or verbs) became organic affixes, though the conjunctive and the participial Ps retained their independent character. Besides, some nouns are also used as separate Ps in NIA. The following are some relevant examples:

- (27) a. kore ‘having done’
 b. diye ‘having given’
 c. dara INST of dvar ‘through the instrumentality of’

The first two are the conjunctive forms used with the base noun. Given the historical analysis above, all three are counted as “P”s, a./b. being verbal and c. being nominal.

The similarity in their postpositional nature can be seen clearly if we now compare the causative with the passive:

- (28) a. aSa-ke diye kaj kOr-a-l-am
 Asha-DAT CP work do-CAUS-PRF-1S
 ‘I got Asha to do the work’
 b. aSa-r dara boi pOR-a holo
 -GEN by book read-PASS became
 ‘The book was read by Asha’

The similarity between them is that both the “agents” of the causative (28a) and the passive (28b) employ historical “P”s; the template being N+Case “P”. The difference is that the causative agent is verbal while the passive agent is nominal. I will represent this state of affairs as

- (29) -ke diye $P \rightarrow P_V \rightarrow LV$
 -r dara $P \rightarrow P_N$

I conclude that the dethroning of the agent or suppressing the agency of the agent is achieved by taking on of the P-function by an N rather than a V, both being common strategies in IE for attaining the P-function. In short, this is the $B \rightarrow C$ effect seen in passives.

5.3 The Syntax of the Butterpillar Effect

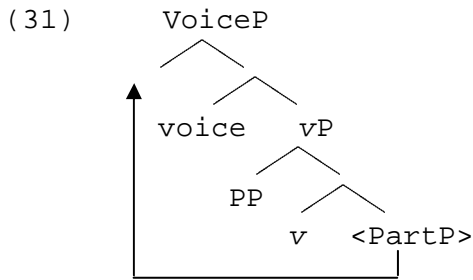
Compare now the passive with its other current cousin, the gerund. By the reasoning offered above, it becomes clear that the gerund is the most nominal of the three. Consider the following (cf. (28)):

- (30) aSa-r boi pOR-a ...
 -GEN book read-GER
 ‘Asha’s reading of the book.’

That is, the functional verbal head v (in the form of an abstract CAUS, PASS, BECOME) is not available to the gerund construction.

Thus a separation of the V and v is required to adequately capture the ambiguity that the passive and the gerund constructions in Bangla display. One way of realizing the abstract head v in case of passives would be to demand $V \rightarrow v$ movement. However, the comparison with the gerund encourages us to seek an alternative view on the matter. The best way to bring to surface the spelled out abstract head is to bypass it completely; that is, in fact, the absence of $V \rightarrow v$ would force the abstract v to surface in the case of the passive. This also brings to the fore the two competing available analyses of the passive, the XP movement (Collins 2005) and the head movement (Kural 1998) analysis.

I would like to point out that the separation of V and v viewed in this way is captured in Collins (2005), although he does not see bypassing the v head as the highlight of the analysis. Rather, for him, the phrasal movement is to move the passive morphology along with the object out of the vP . Collins’ “smuggling” approach to passive is shown below:



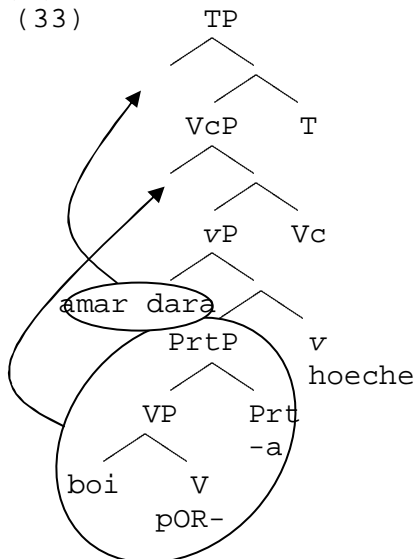
Here PartP hosting the passive morphology “smuggles” the internal argument across the vP to a higher domain. The smuggling approach thus captures in spirit what the historical findings above dictate: that, the C→B effect in passives is achieved by movement of the passive morphology outside the vP domain.

There is an account available within the domain of parsing that too, in effect, advocates a separation of V and v, mainly because it is based on Minimalism. This is Fong’s (to appear) **Probe-Goal** parser. Among the basic elements of the system of Fong’s account, are also lexical definitions and ETs (Elementary Trees), the latter an alternative to Merge/ Move in Minimalism, strictly unimplementable in an LR, on-line parsing. What is of interest here (see section 6 for an introduction to Fong’s system) is the way the lexical definitions are set up and the way the ETs compositionally combine to produce a parse tree. The de-linking between V and v captures, among other things, the difference between the unaccusative and the causative.

This separation provides further motivation to adopt the smuggling approach to passives in Bangla. Consider the following example for illustration:

- (32) amar dara boi pORa hoeche
 I-GEN by book read.PASS become.PST
 ‘The book has been read by me.’

I will assume that the passive projects a VoiceP above the vP hosting the passive morphology, the latter expressed within the projection of PartP. The following tree shows the derivation of the sentence in (32):



In spirit, this analysis captures, in essence, the subject properties of the passive agent in Bangla (and Hindi/ Urdu). Mahajan (1994), in fact, assumes that the EA moves to the subject position after having been assigned lexical Case at its base position. The analysis defended here is different in the sense that the EA is considered to be assigned Nominative at the [Spec,TP] position mainly because the historical antecedent of the so-called “P” *dara* is nominal. Further, the movement of the object in the earlier account is to [Spec,Agr_oP] to check Case and agreement. In the present account, the object does move to a higher functional projection but along with the whole category hosting the PASS morphology. So, in keeping with the properties of the passive in Bangla (and Hindi/ Urdu), the Voice head here does not select a vP without an EA position.

However, the question that this account raises is the following: are these two approaches, smuggling and a Minimalist Parser compatible? In order to answer this question, let us look at Fong’s Minimalist Parser in brief.

6 A Minimalist Parser

The fact that a partial parse is always available in a Minimalist Parser like that of Fong (to appear), suggests that it is similar to the Minimalist Program [MP], especially in relation to incremental processing which is the basic procedure for building up a computation derivationally in MP. Incremental processing, at the heart of derivational bottom up approach that MP advocates, also invites the possibility of seeing shallow parsing in action in a Minimalist Parser. In particular, the notion of the **local domain** allows for minimizing search space, a crucial concern in parsing. However, there are differences too between such a parser and the MP:

- Unavailability of Lexical Array (LA)
- No place for Merge/ Move in a LR parser since they are bottom up; **ETs** are the alternatives to them
- **Move Box** to capture effects of θ -theory
- **Probe Box** to capture Case and PIC⁶

The system of a Minimalist Parser like that of Fong’s is based on the following components:

- (i) A lexicon, which specifies the LIs, properties, uninterpretable features:

LI	properties	-Intp features	
		ϕ features	Other
v* (trans)	select(V) spec(select(N)) value(case(acc))	per(P) num(N) gen(G)	(epp)
v (unacc)	select(V)		
v# (unerg)	select(V) spec(select(N))		
PRT (pass)	select(V)	per(P) num(N)	case(_)

Figure 1: A brief lexicon

The lexicon thus is a representation of the Minimalist Inquiries framework (Chomsky, 1998) except the separation of property and uninterpretable features.

Furthermore, it is assumed that heads like C(Wh), T, T_{def}, v* and v are Probes with uninterpretable features which participate in Agree. Various lexical definitions, like select (V), spec(select(N)) for v* in Figure 1 above, provide information to build ETs but do not themselves participate in Agree.

The basic units of operations are the ETs which also form the base component of TAG of Joshi and Schabes (1997). It is assumed that parsing proceeds in parts through composition of ETs that contain open positions. Some relevant ETs are represented below:

v*/v/v#			V (unerg)	V (trans/ Unacc)
v ∧	v ∧	v ∧	V	V ∧
v ∧ v*		v ∧ v#		V ∧ V
(e)	(f)	(g)	(h)	(i)

Figure 2: Elementary Trees

⁶ In the structure [ZP ..Z...[HP XP [H YP]], the domain of H, for strong phase HP, is not accessible to operations at ZP, but only H and its edge (where edge is the residue outside H’) (Chomsky 1998)

By scanning Figure 1 and Figure 2, it can be seen that both transitive v^* and unergative $v^\#$ have selectional properties $select(V)$ and $spec(select(N))$ represented by ETs with two open positions as in (e) and (g). With the help of the lexicon and the ETs, elementary tree operations combine to produce a parse tree.

The Move Box, on the other hand, is like a holding cell and open positions in a parse tree can be filled by the contents of the Move Box. However, Move Box also introduces a choice point, whether to pick an LI from it or from the input string. The following preference rule is introduced to eliminate this choice point:

- (34) **Move Box Preference Rule**
 When filling open positions, always prefer the Move Box over the input.

Finally, **Agree** is the central relation computed by the parser in this system. Elements involving Agree are picked from the most current Probe stored in the **Probe Box**. In Chomsky (1998), Agree is defined as follows:

- (35) $Agree(p, g)$ if
 a. $Match(p, g)$ holds. Then:
 b. $Value(p, g)$ for matching features
 c. $Value(p, g)$ for property value(f)

Agree is run on an item as soon as it is inserted into the structure. The single box content of the Probe Box also preserves the idea of a Phase as in Minimalism.⁷ Thus a probe cannot penetrate into the domain of a lower probe since it is displaced as soon as the parser encounters a new probe.

With these building blocks in place, the following algorithm is followed to produce the parse:

- (36) **Parse**
 a. Given a category X, pick an ET headed by X
 b. From the Move Box or input:
 i. Fill in the Spec
 ii. Run $Agree(p, g)$ if both p, g are non-empty
 iii. Fill in the Head
 iv. Copy h to Probe Box if h is a probe
 v. Fill in the complement by recursively calling parse with X' where X has lexical property $select(X')$

6.1 “Smuggling” in a Minimalist Parser?

The question raised in the title of this section is the same question raised at the end of section 5.3. That is, the compatibility of the smuggling approach to the Bangla passive that we have adopted (see (33)) with a Minimalist Parser remains to be examined before we can comment on the implementability of that approach.

Consider in this connection the parse of the passive sentence in (15a) shown in Figure 3.

Action	Parse	Input	MBox	PBox
:select(T)	[_T [T]]	[joner dara] boi pORa hoeche	empty	empty
Fill Spec-T	[_T [joner dara] [T]]	boi pORa hoeche	[Pn]	empty
Fill Head-T	[_T [joner dara] [_T past(+)]]	boi pORa hoeche	[Pn]	[past(+)]
T:select(Vc)	[_T [joner dara] [_{Vc} [Vc]] [_T past(+)]]	boi pORa hoeche	[Pn]	[past(+)]
Fill Spec-Vc	[_T [joner dara] [_{Vc} ?? [Vc]] [_T past(+)]]	?? hoeche	[Pn]	Agree

Figure 3: Failure of the passive parse involving “smuggling”

In step 5, after spec-Vc is somehow filled (see discussion later), $Agree(T, Spec-Vc)$ will run though it will not consider the whole PRT phrase (even if the whole phrase was somehow allowed to be picked up from the input string) but only the first word *boi*. Since Match will take place between the ϕ -features (per(3)) of the object with the probe, Case on the object will be valued as nom, wrongly.

The parser will thus fail at this stage for at least two reasons. First, it cannot select two words (*boi pORa*) to fill the spec of Vc in a LR parser. Viewed from another perspective, even if the PRT phrase is allowed to be picked up as a whole at Spec-Vc, Agree will be run and the Case feature of *boi* will be

⁷ The head of a phase is “inert” after the phase is completed, triggering no further operations.

wrongly valued as nom, as noted above. Note that in the theory presented earlier (see section 5.3), the Bangla passive does not display a different Case/ agreement behaviour from the active.

However, the phrase structure of the parse in Figure 3 shows that when Spec,T is filled, it seems to be able to pick a phrase rather than just a word. I claim that this case is different from PRT as the DP (and not PP) formed in a separate parse either run in parallel or sequentially, is a complete amalgamated word-like structure, often a good way to define a Phase in Minimalism.⁸

The claim that it is a DP is supported by the nature of the so-called ‘‘P’’ *dara*, discussed in detail earlier in section 5.2. In particular, its nominal nature makes the ‘‘subject’’ of the DP carry a GENITIVE. Crucially, for the analysis of passive defended in this paper, the nominal nature of the phrase where the EA is embedded, forces it to value its Case feature as NOMINATIVE. Again, given the discussion earlier, I will denote this phrase as Pn.

If the object moves up alone, again, Agree will run and the Case of *boi* will be valued as nom, leaving the property feature value(case(acc)) at Vc to value the Case of the subject as acc when t(Pn) is reconstructed in its θ -position at a later stage. This is shown in Figure 4.

Fill Spec-Vc	... [_{Vc} <i>boi</i> [_{Vc}]]	pORa hoeche	[Pn]	Apply (36bii) Agree(T, <i>boi</i>) Value(ϕ - <i>boi</i> , ϕ -T) Value(T,case- <i>boi</i>)
Vc:select(v*)	... [_{Vc} <i>boi</i> [[_{v*} _]v*]Vc]]	pORa hoeche	[Pn]	v* (T displaced, PIC)
Fill Spec-v*	... [_{Vc} <i>boi</i> [[_{v*} t(Pn)]v*]Vc]]	pORa hoeche	empty	v*
Fill Head-v*	... [_{Vc} <i>boi</i> [[_{v*} t(Pn)]hoeche]]Vc]]	pORa	empty	v*
v*:select(PRT)	... [_{v*} t(Pn) [_{PRT} _ [PRT]]hoeche]]	pORa	empty	v*
Fill Head-PRT	... [_{v*} t(Pn) [_{PRT} _ [-a]]hoeche]]	pOR-	empty	v*
PRT:select(V)	... [_{v*} t(Pn) [_{PRT} [V _ [V]] [-a]]hoeche]]	pOR-	empty	v*
Fill Head-V	... [_{v*} t(Pn) [_{PRT} [V _ [pOR]] [-a]]hoeche]]	empty	empty	v*
Fill Compl-V	... [_{v*} t(Pn) [_{PRT} [v(<i>boi</i>) [pOR]] [-a]]hoeche]]	empty	empty	v*

Figure 4: Failure of the passive parse without ‘‘smuggling’’

In this approach (without smuggling), the parse ends at the last step shown since there is nothing else to select. However, this is not the correct phrase structure of the parse because Pn has remained Case-less and v* is still active since it has not checked its value(case(acc)) property feature.

Thus we conclude that the movement of the object is not possible in such a parser whether it is smuggled or moved on its own (the latter, violating Minimality). This implies that whatever be the solution to such a problem, it must rest on the absence of object-movement. Note that, if there is no object movement, the projection Vc is unnecessary too. In terms of the parse shown in Figure 3, step 5 should really be T:select(v*) and when the Spec-v* is filled with t(Pn), Agree is run and nom is valued on Pn along with epp and ϕ -features matching.

7 Conclusion

We thus conclude that an implementable parsing algorithm cannot mimic the syntactic object movement out of the VP-shell hosting the passive morphology in a Minimalist Parser based on the Probe-Goal approach to parsing. Furthermore, positing a Voice Phrase in passives is also seen as unnecessary. In effect thus, the lack of object movement, which is mandatory for the Probe-Goal theory to work within *syntax*, finds a strong support from a parser based on such an approach. A syntactic account such as Mahajan’s (1994), which obligatorily moves the object to the spec of a higher functional projection (Agr_oP for him), will therefore not be implementable in a Minimalist parser.

⁸ On parallel workspaces in Syntax, see Uriagereka (1999) and much later work that uses the model of Multiple Spell-Out developed first in that work.

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