

Factivity alternation: A case study on Bangla attitude verb *bhab-*

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This paper challenges the view that factivity is solely derived from verbs, using the Bangla attitude verb *bhab-* ‘think’ as a case study. The verb *bhab-* shows factivity alternation, yielding factive (REMEMBER/RECALL) or non-factive (THINK) readings depending on the type of complement. It is consistently factive with gerundial DPs, but not with finite clauses. Bangla has two kinds of finite embedded clauses: nominal-like *je*-clauses and adverbial-like *bole*-clauses. With *je*-clauses, *bhab-* may express REMEMBER/RECALL in certain contexts; with *bole*-clauses, it always expresses THINK. We argue that a RECALL reading arises when the internal Theme argument always pre-exists the matrix event. Gerundial complements meet this condition and compose directly as Themes, hence triggering factivity. *Bole*-clauses, by contrast, only modify the eventuality argument and never yield factive inferences. *Je*-clauses restrict the Theme but do not guarantee factivity. When factivity does arise with a *je*-clause, we propose the complement is a DP – not a CP – headed by a null fact-denoting noun modified by the *je*-clause, and this DP also pre-exists the matrix event always. We adopt a Landman (1996, 2000)-style analysis of *bhab-*, where both object and subject are mapped onto the set of events.

KEYWORDS: factivity alternation, attitude verb, gerund, classifier, *je*-clause, *bole*-clause, situation semantics, Bangla.

1. Introduction

There are several viewpoints regarding how factivity is encoded in language. According to some, factive inference is encoded into verbs (Hintikka 1962; Percus 2006). Others claim that it is not intrinsic to verbs; rather, it

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arises during composition between verbs and certain types of clausal complements. See the following:

- (1) (Schulz 2003: 10)
- a. *Mary_i forgot that she_i filled the tank.* » *Mary filled the tank.*
 - b. *Mary forgot to fill the tank.* ¬» *Mary did not fill the tank.*

The verb *forget* is factive with a *that*-clause. It presupposes (») the truth of the *that*-clause as shown in (1a). But, it is not factive with an infinitival clause. A compositional approach toward factivity explains what is called FACTIVITY ALTERNATION (Moulton 2009; Abrusàn 2011; Özyıldız 2017; Bondarenko 2019b, 2020). The term ‘factivity alternation’ refers to the phenomenon where an attitude verb exhibits both factive and non-factive readings based on the complement-type it takes.

This paper focuses on a Bangla attitude verb, viz. *bhab-* ‘think’, which displays both factive and non-factive readings, depending on which type of complement it is composed with.¹ It always has a factive avatar when it embeds a gerundial DP, whereas it behaves differently when combined with finite clauses. Consider the following:

- (2) Context: Due to suffering from severe dementia, Rabi cannot recall things properly. He was saying that he recalls that Anu and Mina used to get back home together from university. But, knowing his mental illness, the speaker doubts whether Anu and Mina used to do so.
- a. *Rabi bhabchilo je Anu ar Mina ekshathe bari phirto.*²
Rabi think.PROG.PST.3 thatAnu and Mina together house return.HAB.PST.3
‘Rabi was thinking/imagining that Anu and Mina used to return home together.’
 - b. *Rabi Anu ar Mina ekshathe bari phirto bole bhabchilo.*
Rabi Anu and Mina togetherhouse return.HAB.PST.3 BOLE think.PROG.PST.3
‘Rabi was thinking/imagining that Anu and Mina used to return home together.’
 - c. **Rabi Anu ar Mina-r ekshathe bari pher-a-gulo bhabchilo.*
Rabi Anu and Mina-GEN together house return-GER-CLF think.PROG.PST.3
‘*Rabi was remembering/recalling Anu and Mina’s returns to their house together.’

In this context, the speaker can use (2a) or (2b), but not (2c). While (2a-b) involve finite clauses, (2c) features a gerund DP and is infelicitous due to the speaker’s uncertainty about Anu and Mina’s routine. Marked with ‘*’, (2c) implies a factive reading – specifically, a RECALL sense – which contradicts the assumed ignorance. This shows that *bhab-* paired with gerundial complements triggers factivity, unlike its behavior with other clause types. Thus, *bhab-* does not consistently exhibit factivity across all complement structures.

Although (2a) shows a non-factive reading with a *je*-clause, native speakers report that *bhab-* can express factivity with *je*-clauses in memory-recall

contexts like (3). In contrast, *bhab-* never yields a factive reading with *bole*-clauses, which consistently convey a THINK interpretation. Therefore, (3b) is infelicitous in a recall context.

- (3) Context: Rabi was recollecting that Anu and Mina used to return home together regularly. He remembered their friendship.
- a. *Rabi bhabchilo je Anu ar Mina ekshathe bari phirto.*³
 Rabi think.PROG.PST.3 that Anu and Mina together house return.HAB.PST.3
 ‘Rabi was remembering/recalling that Anu and Mina used to return home together.’
 - b. **Rabi Anu ar Mina ekshathe bari phirto bole bhabchilo.*
 Rabi Anu and Mina together house return.HAB.PST.3 BOLE think.PROG.PST.3
 ‘*Rabi was thinking/imagining that Anu and Mina used to return home together.’
 - c. *Rabi Anu ar Mina-r ekshathe bari pher-a-gulo bhabchilo.*
 Rabi Anu and Mina-GEN together house return-GER-CLF think.PROG.PST.3
 ‘Rabi was remembering/recalling Anu and Mina’s returns to their house together.’

Note that in this *recall* context, the sentence (2c) (= (3c)) where *bhab-* takes a gerundial DP complement sounds apt because (3) is a factive context. It gives us the footing to claim that (2c) can be uttered only with a factive RECALL sense.

This paper explores the complexity of factivity alternation in the Bangla verb *bhab-* and how it shifts across complement types. We argue that *bhab-* is not inherently factive. Its factive reading with gerundial complements arises because the gerund serves as the Theme and denotes an event that always precedes the matrix event. In contrast, *bole*-clauses merely modify the matrix eventuality and never trigger factivity. *Je*-clauses, we argue, restrict the Theme argument and do not guarantee factive inferences. However, when *je*-clauses yield factive readings (e.g. in (3a)), we propose that the complement is actually a DP headed by a silent fact noun modified by the *je*-clause, and this DP also always pre-exists the main event. We show that *bhab-* composes with DPs of type *e* or *v* by saturating its internal/Theme argument, while bare *je*-CPs act as restrictive modifiers, and *bole*-clauses modify the event directly.

This paper is arranged as follows: the next section, §2, provides empirical data on where factive readings arise. §3 discusses the syntax and semantics of *je*- and *bole*-clauses. §4 focuses on Bangla gerunds and classifier interactions. §5 analyzes how *bhab-* combines with *bole*-clauses, and §6 addresses its interaction with *je*-clauses. §7 presents a formal analysis of factivity with gerundial complements. §8 concludes the paper, and the Appendix compares *bhab-* with similar Bangla attitude verbs.

2. Empirical landscape: Factive and non-factive readings

In (2a-b), the truth of the proposition that Anu and Mina used to return home together is neither presupposed nor entailed, whereas the content of the complement is both presupposed and entailed in (2c). Consider the following, where the truth of both *je*- and *bole*-clauses in the context (2) can be defeated:

- (4) Context: Due to suffering from severe dementia, Rabi cannot recall things properly. He said he recalls that Anu and Mina used to get back home together from university. But it was Sita, not Mina, whom Anu used to return with.

a. *Rabi bhabchilo je Anu_i ar Mina ekshathe*
 Rabi think.PROG.PST.3 that Anu and Mina together
bari phirto kintu o_i Mina-r shathe noy,
 house return.HAB.PST.3 but she Mina-GEN with not
Sita-r shathe phirto.
 Sita-GEN with return.HAB.PST.3
 ‘Rabi was thinking/imagining that Anu_i and Mina used to return home together, but she_i used to return with Sita, not Mina.’

b. *Rabi Anu_i ar Mina ekshathe bari phirto bole*
 Rabi Anu and Mina together house return.HAB.PST.3 BOLE
bhabchilo kintu o_i Mina-r shathe noy, Sita-r
 think. PROG.PST.3 but she Mina-GEN with not Sita-GEN
shathe phirto.
 with return.HAB.PST.3
 ‘Rabi was thinking/imagining that Anu_i and Mina used to return home together, but she_i used to return with Sita, not Mina.’

As seen in the above cases, the *but*-extension can follow the attitude reports, canceling the truth of the proposition that Anu and Mina used to get back home together. Thus, no entailment emerges in these cases. It can be shown by executing von Fintel’s (2004) ‘Hey! wait a minute’ (HWAM) test that the same proposition is not presupposed. Consider the following conversation in the context where Rabi, who suffers from dementia, claims that Anu used to return home with Mina, and the speaker (S) doubts it:

- (5) S: *Rabi bhabchilo je Anu ar Mina ekshathe bari*
 Rabi think.PROG.PST.3 that Anu and Mina together house
phirto./ Rabi Anu ar Mina ekshathe bari
 return.HAB.PST.3/ Rabi Anu and Mina together house
phirto bole bhabchilo.
 return.HAB.PST.3 BOLE think.PROG.PST.3
 ‘Rabi was thinking/imagining that Anu and Mina used to return home together.’

H: *Ei! ek minute dara, ami jantam na je Anu ar
 hey one minute wait I know.HAB.PST.1 NEG that Anu and
 Mina ekshathe bari phirto.
 Mina together house return.HAB.PST.3
 ‘*Hey! wait a minute, I did not know that Anu and Mina used to return home together.’

Since the proposition that Anu and Mina used to return home together is not presupposed, the speaker’s claimed ignorance is incoherent, making the hearer’s (H) response infelicitous. On the other hand, under such a context where the speaker doubts whether Anu and Mina used to return home together, (2c) (if uttered) will be infelicitous because the content of the gerundial complement cannot be doubted or denied. See the following incompatibility where the contradictory *but*-clause cannot follow (2c):

- (6) Rabi Anu ar Mina-r ekshathe bari pher-a-gulo
 Rabi Anu and Mina-GEN together house return-GER-CLF
bhabchilo. *kintu ora konodin ekshathe bari phere ni.
 think.PROG.PST.3 but they ever together house return.3 PRF.PST.NEG
 ‘Rabi was remembering/recalling Anu and Mina’s returns to their house together,
 *but they did not ever return home together.’

The content of the gerundial complement being entailed, the second conjunct in (6) becomes inappropriate because it attempts to cancel the truth of their returns together. Now, the question will be: is it only entailment, or presupposition? Let us now perform the HWAM test.

- (7) S: Rabi Anu ar Mina-r ekshathe bari pher-a-gulo
 Rabi Anu and Mina-GEN together house return-GER-CLF
bhabchilo.
 think.PROG.PST.3
 ‘Rabi was remembering/recalling Anu and Mina’s returns to their house together.’
 H: Ei! ek minute dara, ami jantam na je Anu ar
 hey one minute wait I know.HAB.PST.1 NEG that Anu and
 Mina ekshathe bari phirto.
 Mina together house return.HAB.PST.3
 ‘Hey! wait a minute, I did not know that Anu and Mina used to return home together.’

Unlike (5), H’s response to S does not turn out to be weird in the above conversation. Because of the presupposed status of the complement, H’s ignorance about their returns together seems felicitous to us. Hence, the content of the complement is both presupposed and entailed in (2c), giving rise to factivity as per the views of Gazdar (1979), Schlenker (2010), Abrusàn (2011),

Anand & Hacquard (2014), Spector & Egré (2015). As opposed to it, no such phenomena are noted in (2a-b). Thus, no factive readings emerge there.

But under a context like (3), i.e. a context of reminiscing about past events, the content of the *je*-clause cannot be canceled because a contradictory *but*-clause cannot follow (3a).⁴ Consider the following incompatibility where (3a) is followed by a contradictory *but*-clause:

- (8) Context: Rabi was recalling the moments Anu spent with Mina.

a.	<i>Rabi</i>	<i>bhabchilo</i>	<i>je</i>	<i>Anu</i>	<i>ar</i>	<i>Mina</i>	<i>ekshathe</i>
	Rabi	think.PROG.PST.3	that	Anu	and	Mina	together
	<i>bari</i>	<i>phirto</i>	<i>*kintu</i>	<i>ora</i>	<i>konodin</i>	<i>ekshathe</i>	<i>bari</i>
	house	return.HAB.PST.3	but	they	ever	together	house
	<i>phere</i>	<i>ni.</i>					
	return.3 PST.PRF.NEG						

‘Rabi was remembering/recalling the fact that Anu and Mina used to return home together, *but they did not ever return home together.’

Not only entailed, but the truth of the embedded clause in (3a) is presupposed, and the presupposed status can be observed via the same HWAM test. Under context (3), the speaker’s ignorance about Anu and Mina’s returning home together turns out to be felicitous in response to (3a). The projection of the embedded clauses in (3a) as well as (2c) can also be shown under the scope of entailment-canceling operators such as possibility modals, yes/no questions, etc. See the following:

- (9) Context: Anu and Mina regularly returned home together, a fact known to both the speaker and Rabi. During a conversation about their time together, Rabi suddenly paused and said, “I’m recalling something,” without specifying what. The speaker then inferred what Rabi was recollecting.

a.	<i>Rabi</i>	<i>hoyto</i>	<i>bhabchilo</i>	<i>je</i>	<i>Anu</i>	<i>ar</i>	<i>Mina</i>	<i>ekshathe</i>
	Rabi	possibly	think.PROG.PST.3	that	Anu	and	Mina	together
	<i>bari</i>	<i>phirto.</i>						
	house	return.HAB.PST.3						

‘Possibly, Rabi was remembering/recalling the fact that Anu and Mina used to return home together.’ → Anu and Mina used to return home together.

b.	<i>Rabi</i>	<i>hoyto</i>	<i>Anu</i>	<i>ar</i>	<i>Mina-r</i>	<i>ekshathe</i>	<i>bari</i>
	Rabi	possibly	Anu	and	Mina-GEN	together	house
	<i>pher-a-gulo</i>	<i>bhabchilo.</i>					
	return-GER-CLF think.PROG.PST.3						

‘Possibly, Rabi was remembering/recalling Anu and Mina’s returns to their house together.’ → Anu and Mina used to return home together.

The verb *bhab-* does not show uniform behavior across clause types. With *bole*-clauses, it is consistently non-factive (2b), while with gerundial complements, it always triggers factivity (2c). Interestingly, with *je*-clauses, *bhab-* is context-sensitive: it can express either a THINK or a RECALL reading, as shown in (2a) and (3a), respectively. This leads us to the following pattern of factivity alternation for *bhab-*:

<i>bhab-</i> ‘think’	FACTIVITY
<i>je</i> -clause	Can be both factive and non-factive
<i>bole</i> -clause	No
Gerundial DP	Yes, always

Table 1. Factivity alternating nature of Bangla attitude verb *bhab-* ‘think’ with different sizes of clauses.

To proceed further with the explanation of this phenomenon, we need to have a look at the syntax-semantics of Bangla *je*-clause, *bole*-clause, and gerunds in detail. The next section sheds light on how the Bangla *je*- and *bole*-clauses can be viewed.

3. A brief description of Bangla je-clause and bole-clause

Bangla exhibits a hybrid complementizer system with both clause-initial (*je*) and clause-final (*bole*) complementizers (Singh 1980; Bayer 1996, 1999, 2001; Bayer *et al.* 2005). According to Bayer (2001), clause-final complementizers like *bole* are VERBA DICENDI and function as QUOTATIVES, marking reported speech by setting prior discourse in quotes.⁵ In contrast, clause-initial complementizers in Indo-European languages, including Bangla, Oriya, and Hindi, derive from operator elements like *ki* (‘what’) or *je* (‘which’). However, in Bangla, *je* has lost its operator status and functions as a C⁰ head rather than appearing in [Spec, CP], as an operator would. Some Indo-Aryan languages (e.g. Bangla, Assamese) retain both complementizer types, while Dravidian languages typically retain only the clause-final form. The quotative *bole* originates from a verbal root meaning ‘say’, followed by participial morphology (e.g. -e, -i). Bayer (1996) supports the non-operator status of *je* with examples from Bangla and Oriya.

(10) Bayer (1996: 258)

- a. *tumi* [ki OSukhe]_i bhabcho [je e_i ram mara gEche]?
 you which illness-LOC think-2 COMP Ram die go-PTS3
 Of which illness do you think that Ram died?
- b. *kie*_i tume bhaabucha [je e_i raamaku saahaajya kariba]?
 who you are-thinking COMP Ram help will-do
 Who do you think will help Ram? (from Bal 1990)

Bayer argues that if *je* were an operator occupying the embedded [Spec, CP], it would block *wh*-extraction by preventing the licensing of intermediate traces. However, since the relevant constructions are grammatical, *je* must function as a complementizer, not an operator. While *je* may have a historical link to a relativizing operator, this does not entail that it retains operator status. Bayer (1996) supports this with cross-linguistic evidence from Germanic, Romance, Slavic, and Modern Greek, where complementizers originate from deictic pronouns or *wh*-operators that have been reanalyzed as C⁰ heads – a process also observed in Bangla, Oriya, and Assamese.

Thus, following Bayer, both *je* and *bole* are complementizers.⁶ Let us now see if there is any difference between these two types of clauses. Bayer *et al.* (2005: 95) exhibit that *je*-clauses can be modified by nominals, whereas *bole*-clauses cannot.

(11) Bayer *et al.* (2005: 95)

- a. *c^hele-ta* (e kɔtʰa) fune-c^he [ɽe or baba aʃ-be].
 boy-CL this news heard-has that his father come-will
 ‘The boy heard (it) that his father will come.’
- b. [[or baba] aʃ-be bɔl-e c^hele-ta (*e kɔtʰa) fune-c^he].
 his father come-FUT say-PRT boy-CL this news heard-has
 ‘[That his father will come] the boy has heard.’

Though a *je*-CP modifies an NP in (11a), the grammatically licensed structure is where the *je*-clause, which modifies the noun, is ‘extraposed’. In a pre-verbal position, it does not sound okay to native speakers. See the following:

(12) Bayer (1996: 258)

- a. ??chele-Ta [e KOtha] [je baba aS-be] jan-e na.
 boy-CF this news COMP father come-FUT3 know-3 not

As mentioned in Bayer (1996), (12) turns out to be completely ungrammatical when the NP *e KOtha* ‘this news’ is replaced by an empty pronoun.

(13) *chele-Ta *pro* [je baba aS-be] jan-e na. (*ibid.*)

Thus, the claim that a *je*-clause needs to be licensed by a null DP does not get justification. If that were the case, (13) would have been a grammatical construction.

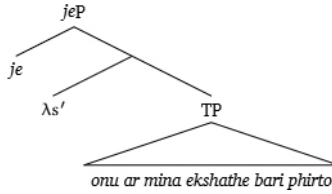
Bayer's (1996) extraction example in (10a) speaks in favor of the argument status of the *je*-clause because a *wh*-phrase can be extracted out of a complement zone. While accounting for its semantics, we base ourselves on the CP Predicate Hypothesis (Moulton 2009; Kratzer 2013b; Moulton 2013, 2015), according to which complementizers turn clauses into predicates. Following this hypothesis, the complementizer introduces the Content function as defined below, given a situation *s* and an assignment function *g*:

$$(14) \llbracket C \rrbracket^{s,g} = \lambda p_{\langle s,t \rangle} \lambda x_e. \text{Contents}(x) = p$$

It takes a proposition and returns the set of CONTENTFUL INDIVIDUALS (*ibid.*), such that their Content is identical to the proposition that is *C*'s complement. (14) is a partial function because not every individual is contentful. Individuals such as *stories*, *rumors*, *facts*, etc., are contentful; they have propositions as their content. On the other hand, individuals like *the man*, *my mother*, *John*, etc., do not have any propositional content. The Content function is dubbed under CONTENT MODALITY in Kratzer (2013b). It is a domain-fixing function that is defined for entities that determine their intentional contents. For any *y* in the domain of Content: $\text{Content}(y) = \{s \mid s \text{ is compatible with the intentional content determined by } y\}$.

We follow Moulton (2019) in assuming that the *je*-clause in (2a) refers to the predicate of contentful individuals. The anatomy of the embedded *je*-clause is shown in (15).

(15)



We assume that the TP holds in *s'* iff Anu and Mina used to return home together in *s'*. The situation-abstraction is now applied to this *t*-type TP to make it a proposition of type $\langle s,t \rangle$.⁷ It then combines with the complementizer by the rule of Intensional Function Application,⁸ resulting in the following interpretation of the embedded *jeP*:

- (16) $\llbracket jeP \rrbracket^{s,g} = \llbracket je \text{ Anu ar Mina ekshathe bari phirto} \rrbracket^{s,g} = \lambda x_e. \text{Contents}(x) = \lambda s'. \text{Anu and Mina used to return home together in } s'$

As per (16), the embedded clause denotes the set of contentful individuals whose Content is the proposition that Anu and Mina used to get home together. A *je*-clause denotes an $\langle e, t \rangle$ -type predicate like English *that*-clause.⁹ The Content function is introduced by the clause-initial *je* that is built on contentful individuals, just like the complementizer *that* in English.¹⁰ In this paper, we argue that a property-like *jeP* acts as a restrictive modifier of the matrix predicate and composes with it, yielding a predicate without changing the degree of unsaturation (*à la* Chung & Lasusaw 2004).

On the other hand, the finite clause in (2b) contains the complementizer *bole*. As mentioned earlier, it is a clause-final complementizer which is a VERBUM DICENDI. Not only in this language, but there are several reports on the conversion of verbs of saying into quotative complementizers in various languages (Crowley 1989; Klamer 2000, among many others). As mentioned in Moulton (2019), Bangla *bole* is similar to Korean *ko*, Japanese *to*, and Zulu *ukuthi* because, like them, it is also built on contentful eventualities, but not individuals.¹¹ Following Klamer (2000), Kidwai (2014) mentioned that the clause-final *bole* is formed by semantic bleaching of the report verb *say*, whose external argument is dropped, and the F-value of it changed from F_0 to F_1 . The F-value corresponds to the functional specification. A verb carries the value F_0 , a change of which denotes that the element is not a regular verb anymore; it has been bleached. The transformation from *say* to *bole* is shown below (Kidwai 2014):



Kidwai also mentioned that *boleP* merges as an extended projection at some lower position in CP where a reportative or hearsay evidential takes its slot, as opposed to some higher CP position that is booked for direct evidence.¹² Kidwai, following Klamer (2000), proposes that this SAY-subordinator got grammaticalized, changing the F-value. We argue that, in this process of grammaticalization, the semantics of SAY in *bole* got depleted. Major (2021), while dealing with Uyghur SAY-based complementizers, points out that these complementizers give rise to indexical shift (Anand & Nevins 2004; Sudo 2012, among many others) because of the presence of the verb *say* in these complementizers, introducing the monstrous operator. But this sort of indexi-

cal shift is not available with the Bangla *bole*-clause. See the following, where native speakers reported that the first-person pronoun may refer to the attitude holder, apart from the speaker.

- (17) *Rabi ami Mina-ke bhalobash-i bole bol-lo.*
 Rabi I Mina-ACC love-PRS.1 BOLE say-PST.3
 ‘Rabi said that I_{Rabi/speaker} love Mina.’

However, we argue that this is not a case of pure indexical shift. Consider the following, where the object in the *bole*-clause (i.e. *Mina-ke*) is replaced with a *wh*-word, and we are not getting the shift with the wide scope reading of the *wh*:

- (18) *Rabi [ami kake bhalobash-i bole] bol-lo?*
 Rabi I who-ACC love-PRS.1 BOLE say-PST.3
 ‘✓Who_i did Rabi say I_{speaker} love t_i?’
 ‘*Who_i did Rabi_k say he_k love t_i?’

The shifted reading is bad in the wide scope reading because in (17), where we were seemingly getting the shifted reading, it was a direct quotation. This is the reason we do not get the wide scope interpretation and the indexical shift together because direct quotation acts as a wall for extraction out of its domain. The lack of a pure indexical shift with *bole*-clauses leads us to assume that *bole* does not carry the speech semantics anymore; it is very much semantically bleached. Another foothold for claiming this is that if *bole*-clauses always explicitly refer to some reported speech, then the following would be expected to be infelicitous, but it is not so:¹³

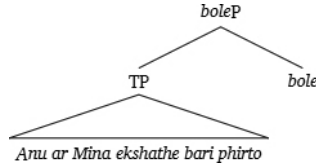
- (19) *Rabi_i [Mina khun-ta koreche bole] bhabchilo, kintu*
 Rabi Mina murder-CLF do.PRF.PRS.3 BOLE think.PROG.PST.3 but
o_i ba keu e kotha konodino kauke bol-e ni.
 he or anyone this talk ever anyone.ACC say-3 PRF.PST.NEG
 ‘Rabi_i was thinking that Mina did the murder, but he_i or anyone did not say this to anyone ever.’

The unavailability of speech semantics in Bangla *bole* is supported by the following example in (20), where the matrix subject is inanimate and, therefore, incapable of speech (cf. Bossi 2023). (20) is uttered in a context where the speaker does not find the addressee’s name in the computer database and reports the same.

- (20) *Computer tar database-e tomar nam nei bole dekhacche.*
 computer its database-LOC your name be.NEG BOLE show.PROG.PRS.3
 ‘The computer is showing that your name is not in its database.’

Thus, it is quite evident that the complementizer *bole* does not carry the semantics of *say* anymore.¹⁴ Rather, it is only diachronically linked to the verb *say* and bleached semantically now. Below is the LF of the concerned *bole*-clause in (2b):

(21)



While accounting for the bleached semantics of *bole*, we bank upon Kratzer (2013a) in viewing it as the phonological realization of the covert reportative modal $\llbracket \text{SAY} \rrbracket$ which can denote mental states too. The semantics of it is in (22) where it takes a proposition p , of type $\langle s, t \rangle$, and returns the set of ν -type eventualities e such that p is the Content of e (Kratzer 2013a; Moulton 2016, 2019). By Intensional Functional Application, it combines with the intensional avatar of the TP and yields the result in (23).

- (22) $\llbracket \text{bole} \rrbracket^{s,g} = \lambda p_{\langle s, t \rangle} \lambda e_{\nu}. \text{Contents}(e) = p$
 (23) $\llbracket \text{boleP} \rrbracket^{s,g} = \llbracket \text{Anu ar Mina ekshathe bari phirto bole} \rrbracket^{s,g} = \lambda e_{\nu}. \text{Contents}(e) = \lambda s'. \text{Anu and Mina used to return home together in } s'$

Relative to the situation s , the *boleP* refers to the set of contentful eventualities of type ν such that the Content of them in s is identical to the proposition that Anu and Mina used to return home together. Thus, both initial and final complementizers in Bangla supply the Content relation; the former imposes it over individuals, whereas the latter does it over eventualities. The type-logical difference between these two types of clauses is liable for the grammaticality and ungrammaticality in (11a) and (11b), respectively. The *je*-clause in (11a) being a predicate of INDIVIDUALS (of type e) can be modified by an $\langle e, t \rangle$ -type nominal *news* while in (11b), the $\langle \nu, t \rangle$ -type *bole*-clause, which is a predicate of EVENTUALITIES (of type ν), cannot get so leading to a type mismatch (cf. Moulton 2019). Another line of difference between a *jeP* and a *boleP* is that the former exhibits only the narrow scope reading of *wh*-items (Bayer 1996; Simpson & Bhattacharya 2003), while the latter shows

only the wide scope readings of them (Kidwai 2014; Balusu 2020; Banerjee 2023b).¹⁵ Consider the following:

- (24) *Ora shuneche je ke ashbe.*
they hear.PRF.PRS.3 that who come.FUT.3
‘*Who have they heard will come?’ (*wh* > matrix V)
‘✓They have heard who will come.’ (matrix V > *wh*)
- (25) *Ora ke ashbe bole shuneche*
they who come.FUT.3 BOLE hear.PRF.PRS.3
‘✓Who have they heard will come?’ (*wh* > matrix V)
‘*They have heard who will come.’ (matrix V > *wh*)

The wide scope reading of *wh* in (25) argues for the vP-adjunction of the finite *bole*-clause (Balusu 2020; Dey 2023; Banerjee 2023b), while the *je*P, as argued earlier, is subject to complementation to the matrix verb. However, if we consider the extraction test, we are likely to get an unexpected result: we find that *wh*-words can be moved out of a *bole*-clause. See the extractions below, which might make readers think that *bole*-clauses are arguments instead of adjuncts.

- (26) *Kake_i tumi [Anu pochondo korbe t_i bole] bhabcho?*
whom you Anu like do.FUT.3 BOLE think.PROG.PRS.3
‘Who do you think Anu will like?’

However, it has been noted in the literature that extractions from adjunct clauses are possible in some cases. Consider the following:

- (27) *What_k did Mina come in [whistling t_k]?* (Bondarenko 2021)

We argue that *bole*-clauses are like *whistling* in (27): they are adjuncts but not islands for movement. In this regard, we follow Truswell’s (2011) claim that *wh*-phrases can be moved out of adjunct clauses when the adjuncts describe a single event with the matrix clause. In §5, we will see that a *bole*-clause describes a single event with the main clause.

4. Unwrapping Bangla gerunds

The complement gerund in (2c) is a bare gerund-classifier complex.¹⁶ Here we use the term ‘bare’ to indicate that no classifiers are attached to the deverbalized NPs. Before getting into the detailed semantics of the complex, we need to look at how bare gerunds can be treated. We follow Grim & McNally’s (2015)

insight in viewing verbal *-ing* forms as event kinds, where the bare gerund, viz. *Anu ar mina-r ekshathe bari phera* ‘Anu and Mina’s returning home together’ can be seen as a description of event kinds. Note that Bangla gerunds have already been treated as sets of eventualities (Bhadra & Banerjee 2021). They kept the gerunds as predicates of events. Here, we converted the predicate into its entity correlate (Portner 1992), which is a kind-level element. Converting into a kind-level expression in our purpose has the advantage of semantically combining classifiers with the gerunds because, following Dayal (2012), Bangla classifiers like *-ta* and *-gulo* ask for kind-level entities as their arguments. See also Bryant & Bhadra (2020), who viewed Oromo nominalizations as event kinds. Viewing the gerund *Anu ar Mina-r ekshathe bari phera* as a kind-level description gets validated because they can return home together many times; the plurality of event tokens leads us to have a kind-level event denotation. Thus, the denotation of it relative to situation *s* can be formulated as below:

$$(28) \llbracket \textit{Anu ar Mina-r ekshathe bari phera} \rrbracket^{s,g} = \lambda e_k [\cup \text{returning}_s(e_k) \wedge \text{Ag}_s(a + m, e_k) \wedge \text{Loc}_s(h, e_k) \wedge \text{together}_s(e_k)]$$

Following Grim & McNally (2015), Chierchia’s (1998) UP operator/pred ($\cup$), of type $\langle e_k, \langle e_k, t \rangle \rangle$, is used to shift the type of *returning* from that of an event kind to a description of event kinds, to add the arguments. Relative to *s*, the concerned bare gerund in (28) denotes the property of event kinds e_k such that e_k is returning together in *s*, agents of e_k are Anu and Mina, and the location of e_k is the house (i.e., *h* in our denotation). To refer to the sum *Anu and Mina*, we use the $+$ operator (after Link 2002). The collection denoted by $a + m$ refers to an expression of type *e*.

4.1 The role of plural classifier *-gulo* on bare gerunds

Bangla is a classifier language (Dayal 2012, 2014). The following is the landscape of the classifier system that Bangla uses:

(29) (Dayal 2012: 196)

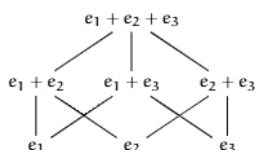
- | | |
|---------------------|--|
| a. <i>-ta/to/te</i> | general classifier for count nouns |
| b. <i>-jon</i> | classifier restricted to humans |
| c. <i>-khana</i> | classifier restricted to inanimate count nouns |
| d. <i>-ra</i> | number-neutral classifier restricted to animate nouns |
| e. <i>-gulo</i> | plural classifier applicable to all count and mass nouns |
| f. <i>-khani</i> | classifier restricted to mass nouns |

Since gerunds are nominals, nothing prevents us from attaching classifiers to them. Out of these instances from (a-f), Bangla bare gerunds can be followed by *-ta* and *-gulo*. The classifier *-ta*, attached to a bare gerund, gives rise to a definite reading. Consider the following:

- (30) Context: Rabi was recalling the incident of Anu and Mina's quitting the job together.
- a. *Rabi* [*Anu ar* *Mina-r* *ekshathe chakri chere* *de-wa-ta*]
Rabi Anu and Mina-GEN together job quit.PFV give-GER-CLF
bhabchilo.
think.PROG.PST.3
'Rabi was recalling Anu and Mina's quitting the job together.'

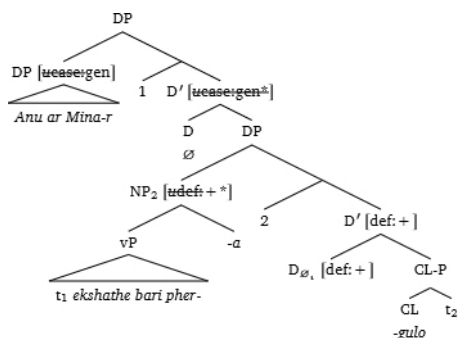
Here, the particular event of their quitting the job together is being referred to, and Rabi remembers that. As opposed to *-gulo*, this classifier points toward an atomic definite event. The classifier *-ta* when suffixed to nominals like *boi* ‘book’ also gives us a definite singular reading, e.g. *boi* + *-ta* → *boi-ta* ‘the book’. See also Dayal (2012, 2014) for more details on this classifier.¹⁷ The latter is attached to the bare gerund as seen in our example (2c). This particular bare gerund-classifier complex refers to the sum of all the events of Anu and Mina returning to their house together. Assuming a situation with three such events, e_1 , e_2 , and e_3 in s , we can imagine the following schematic representation of these events:

- (31)



This lattice-based representation is needed for our purpose because we need to refer to the maximum sum of all the events. Following Dayal’s (2012, 2014) insight, classifiers map kinds onto properties, and the plural *-gulo* takes a kind-level individual and returns the set of non-atomic tokens. We propose the anatomy of the bare gerund-classifier complex, viz. *Anu ar Mina-r ekshathe bari phera-gulo* ‘Anu and Mina’s returns to their house together’, as in (32).

- (32)



As seen in the structure above, the NP moves from the complement position of the classifier head (CL) to [Spec DP] to check [+def] feature, creating a binder 2 that binds the trace t_2 . The lower D is marked for the definite feature since the gerund tells us about the unique plurality of all the returning events whose agent is the collection, i.e. Anu and Mina. This collection, which is the subject of the gerund, base-generates at [Spec, vP] and moves to the specifier of the higher DP to check the Genitive Case that is realized by the *-r* marker. While moving to its target position, it leaves a trace t_1 and creates a binder 1 that binds the trace.

Now extending Dayal's treatment of classifiers to the domain of eventualities, we can define the semantics of the concerned plural classifier in (33), where it takes an event kind and returns the set of non-atomic event tokens.

$$(33) \llbracket \text{-gulo} \rrbracket^{sg} = \lambda e_k \lambda e. [\cup e_k(s)(e) \wedge \neg AT_s(e)]$$

$$(34) \llbracket t_2 \rrbracket^{sg} = g(2) \quad (\text{by trace-rule})$$

The plural classifier *-gulo* composes with the contextually valued trace variable, as in (34), by Function Application (FA), resulting in the denotation of CL-P as in (35). Due to carrying an interpretable [+def] feature, the null D head takes a property P of type $\langle v, t \rangle$ and returns the unique maximal eventuality such that it has the property P . Follow (36). By FA, the property of event tokens as in (35) saturates the property argument introduced by the null definite D. See the result in (37). Now, following the rule of Lambda Abstraction (λ -abstraction), a function from D_v to D_v is yielded. Consider the interpretation in (38).

$$(35) \llbracket \text{CL-P} \rrbracket^{sg} = \lambda e D_v. [\cup g(2)(s)(e) \wedge \neg AT_s(e)] \quad (\text{by FA, (33-34)})$$

$$(36) \llbracket D_{\emptyset} \rrbracket^{sg} = \lambda P_{\langle v, t \rangle}. \iota e_v P(e)^{18}$$

$$(37) \llbracket D' \rrbracket^{sg} = \iota e_v. [\cup g(2)(s)(e) \wedge \neg AT_s(e)] \quad (\text{by FA, (35-36)})$$

$$(38) \llbracket 2 + D' \rrbracket^{sg} = \lambda 2_v. \iota e_v. [\cup 2(s)(e) \wedge \neg AT_s(e)] \quad (\text{by } \lambda\text{-abstraction})$$

$$(39) \llbracket NP_2 \rrbracket^{sg} = \lambda e_k. [\cup \text{returning}_s(e_k) \wedge \text{Ag}_s(g(1), e_k) \wedge \text{Loc}_s(h, e_k) \wedge \text{together}_s(e_k)]$$

To avoid the type-mismatch, we shift the type of NP_2 from that of a predicate (of event kinds) to that of an entity correlate. We can tap into Chierchia's (1998) DOWN operator/nom ($\cap$) to make it an entity-like expression of type v , i.e., $\cap(\lambda e_k. [\cup \text{returning}_s(e_k) \wedge \text{Ag}_s(g(1), e_k) \wedge \text{Loc}_s(h, e_k) \wedge \text{together}_s(e_k)])$). By FA, the lower DP gets its denotation as follows:

$$(40) \llbracket DP \rrbracket^{sg} = \iota e_v. [\cap(\lambda e_k. [\cup \text{returning}_s(e_k) \wedge \text{Ag}_s(g(1), e_k) \wedge \text{Loc}_s(h, e_k) \wedge \text{together}_s(e_k)])(s) \wedge \neg AT_s(e)]$$

(by FA, nom(39) and (38))

Following further compositional steps, i.e., λ -abstraction and a FA afterward, the higher DP will have the denotation relative to s as in (41).

$$(41) \llbracket \text{DP} \rrbracket^{s,g} = \lambda e_v. [\cup (\lambda e_k. [\cup \text{returning}_s(e_k) \wedge \text{Ag}_s(a+m, e_k) \wedge \text{Loc}_s(h, e_k) \wedge \text{together}_s(e_k)])(s) (e) \wedge \neg \text{AT}_s(e)]$$

Assuming a situation like (31), the pred operator, when applied to the v -type event kind, viz. $\cup (\lambda e_k. [\cup \text{returning}_s(e_k) \wedge \text{Ag}_s(a+m, e_k) \wedge \text{Loc}_s(h, e_k) \wedge \text{together}_s(e_k)])$, results in the following extension in s :

$$(42) \{e_1, e_2, e_3, e_1+e_2, e_2+e_3, e_1+e_3, e_1+e_2+e_3\}$$

Thus, relative to s , (41) refers to the unique, maximal, and non-atomic event token of Anu and Mina returning home together in s . Keeping the situation like (31) in mind, it refers to the maximal plurality, i.e., $e_1+e_2+e_3$, which is, of course, non-atomic in nature.

We have analyzed finite *je*-clause, *bole*-clause, and gerunds at the syntax-semantics interface. Now, it's our turn to dive into the semantics of the attitude verb, *bhab-* and its interactions with different clause types. The next section discusses the semantics of the attitude verb in concern and compositionally explores how a non-factive reading comes to the fore when it is composed with a *boleP*.

5. Non-factive reading with a *bole*-clause

We embrace a Landman (!1996, 2000)-style representation while approaching the semantics of the attitude verb *bhab-*. Following a Landman-style logical representation, both object and subject are mapped onto the set of events in verbal semantics. For example, the transitive verb “kiss is a function that maps an object and a subject onto the set of kissing events with that subject as an agent and the object as theme” (Landman 2000: 46). We define the semantics of *bhab-* as in (43).

$$(43) \llbracket \text{bhab-} \rrbracket^{s,g} = \lambda y \in D_e \cup D_v. \lambda x \in D_e. \lambda e \in D_v. \text{think}_s(e) \wedge \text{Exp}_s(e) = x \wedge \text{Th}_s(e) = y \wedge \begin{cases} 1 & \text{if } \text{LB}(\tau(y)) <_{\text{always}} \text{LB}(\tau(e)) \text{ in } s \\ y \text{ is contentful in } s \wedge \forall s' \in \text{DOX}_{x,s}: \\ \text{Content}_s(y)(s') = 1 & \text{otherwise} \end{cases}$$

Relative to s , we assume that *bhab-* takes an object argument and a subject argument. It then maps them onto the set of events e such that e is the event of thinking in s , the experiencer of e is the subject, and the Theme of e is the object. It asserts this much only if the Theme always pre-exists the matrix event (Bondarenko 2019a,b) in s ; otherwise, it additionally asserts that the Theme/object is contentful in s and the propositional content of it is believed by the attitude subject in s . The predicate ‘contentful’ used here can be formalized as follows:

$$(44) \text{ contentful} = \lambda y. \exists p[\text{Content}(y) = p].\text{contentful}(y)$$

It states that an individual y is contentful iff there exists a proposition p which is the Content of y . Thanks to a reviewer for the suggestion to clearly state the formal definition of it. To put it simply, it means that if the Theme of *bhab-* always pre-exists the event of thinking, a RECALL reading emerges; otherwise, it is a default THINK reading.¹⁹ The formalization of *always* can be formulated within the framework of situation semantics (Kratzer 1989; Portner 1992; Elbourne 2013) that views situations as parts/chunks of worlds/maximal situations. Following Elbourne’s (2013) insight, we can formally put forward the following, which stands for what it means for the Theme to always pre-exist the matrix event in s :

$$(45) \text{ LB}(\tau(y)) \text{ always precedes } (<_{\text{always}}) \text{ LB}(\tau(e)) \text{ in } s \text{ iff for all minimal situations } s' \text{ such that } s' \leq s \text{ and the two intervals, viz. } \tau(y) \text{ and } \tau(e), \text{ are in a temporally linear order in } s', \text{ there is a situation } s'' \text{ such that } s'' \text{ is a minimal situation such that } s' \leq s'' \text{ and } s'' \leq s \text{ and the left boundary (LB) of } \tau(y) \text{ precedes } (<) \text{ that of } \tau(e) \text{ in } s''.$$

We also follow the situation-semantic notion of PERSISTENCE, which tells us that if a statement holds in a situation s , it will also hold in every situation that s is part of (Kratzer 1989). Through this notion, we derive the truth in the maximal situation, i.e. the world.

An interesting thing to note about the semantics of *bhab-* is that it can take its object/Theme argument from the domain of individuals (D_e) or the domain of eventualities (D_v). That means the internal argument of it can be of type e or v . We needed to define the type designation of its internal argument this way because, apart from taking gerunds, which are sets of eventualities (2c), it also takes individuals as its object. Consider the following, where the object of *bhab-* is an NP of type e :

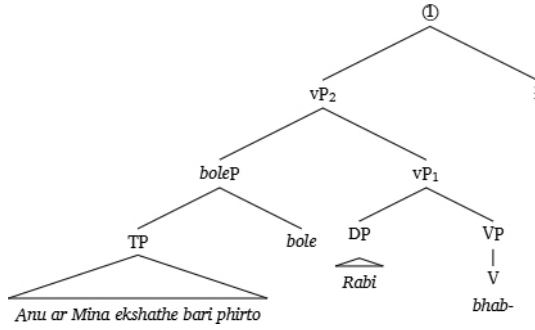
$$(46) \begin{array}{lllll} \text{Rabi} & [_{NP} \text{oi} & \text{din-ta-r} & \text{kotha}] & \text{bhabchilo.} \\ \text{Rabi} & \text{DEM.DIST} & \text{day-CLF-GEN} & \text{talk} & \text{think.PROG.PST.3} \end{array}$$

‘Rabi was remembering that day’

The semantics proposed in (43) can successfully account for (46). The *e*-type nominal *that day* always pre-exists the event of thinking of it and composes with the verb as its Theme. The truth condition of this sentence would be as follows: $\exists e.\text{think}_s(e) \wedge \text{Exp}_s(e) = \text{Rabi} \wedge \text{Th}_s(e) = \text{that day}$, given $\text{LB}(\tau(\text{that day})) <_{\text{always}} \text{LB}(\tau(e))$ in s .

Now, we will exhibit in detail that the above semantics in (43) can handle both RECALL and THINK attitude reports shown previously. In this section, we explore how this kind of attitude semantics can account for the non-factive reading that arises when the verb combines with a *bole*-clause. We propose the structure of (2b) as follows:

(47)



Since *boleP* is composed after the external argument slot of the matrix event gets saturated, we argue that it is not in a position to saturate or modify the internal argument of *bhab-*.²⁰ Rather, it adjoins the *vP*₁ by modifying the eventuality argument of the matrix verb. Even though there is no theme in (47), we do not leave the theme argument of (43) unsaturated. At this point, we proceed by existentially closing it off. Thus, the VP gets its denotation following an existential closure (EC):

(48) $[[VP]]^{s,g} = \text{EC}((43))$

$$\begin{aligned}
 &\equiv \lambda x \in D_e \lambda e \in D_e \exists y.\text{think}_s(e) \wedge \text{Exp}_s(e) = x \wedge \text{Th}_s(e) = y \\
 &\quad \wedge \begin{cases} 1 & \text{if } \text{LB}(\tau(y)) <_{\text{always}} \text{LB}(\tau(e)) \text{ in } s \\ y \text{ is contentful in } s \wedge \forall s' \in \text{DOX}_{x,s}: \\ \text{Content}_s(y)(s') = 1 & \text{otherwise} \end{cases}
 \end{aligned}$$

Now it is time for us to saturate the subject argument by FA. What we have in hand is the denotation of vP_1 , which the *bole*-clause will compose with via adjunction. For the convenience of the reader, we repeat the semantics of the *boleP* below:

$$(23) \llbracket boleP \rrbracket^{s,s} = \lambda e_v. \text{Contents}(e) = \lambda s'. \text{Anu and Mina used to return home together in } s'$$

We argue that it is composed with the vP_1 by Predicate Conjunction,²¹ yielding the interpretation of vP_2 as follows:

$$(49) \llbracket vP_2 \rrbracket^{s,s} = \lambda e \in D_v. \exists y. \text{think}_s(e) \wedge \text{Exp}_s(e) = \text{Rabi} \wedge \text{Th}_s(e) = y$$

$$\wedge \begin{cases} 1 & \text{if } \text{LB}(\tau(y)) <_{\text{always}} \text{LB}(\tau(e)) \text{ in } s \\ y \text{ is contentful in } s \wedge \forall s' \in \text{DOX}_{\text{Rabi},s}: \\ \text{Content}_t(y)(s') = 1 & \text{otherwise} \end{cases}$$

$$\wedge \text{Content}_s(e) = \lambda s'. \text{Anu and Mina used to return home together in } s'$$

Now, the event variable will be closed off and the sentence will hold in s iff the following holds:

$$(50) \exists e \exists y. \text{think}_s(e) \wedge \text{Exp}_s(e) = \text{Rabi} \wedge \text{Th}_s(e) = y$$

$$\wedge \begin{cases} 1 & \text{if } \text{LB}(\tau(y)) <_{\text{always}} \text{LB}(\tau(e)) \text{ in } s \\ y \text{ is contentful in } s \wedge \forall s' \in \text{DOX}_{\text{Rabi},s}: \\ \text{Content}_t(y)(s') = 1 & \text{otherwise} \end{cases}$$

$$\wedge \text{Content}_s(e) = \lambda s'. \text{Anu and Mina used to return home together in } s'$$

In the above condition, the existentially bound Theme argument does not have any lexical correlate and hence does not bother us in this case. It only says that there is an event of thinking e in s , and the Content of e refers to the proposition that Anu and Mina used to return home together, and Rabi is the experiencer of that thinking event. This type of truth condition cannot export any factive inference because the Content of an eventuality does not guarantee truth in the actual situation.

6. Composing with a *je*-clause

In §2, we mentioned that *bhab-* can give rise to either factive or non-factive interpretation while embedding a *je*-clause, depending on the context in which the attitude report is uttered. Recall the context (2), i.e. the dementia scenario, where the verb embedding a *je*-clause does not provide any factive inference at all. Also, recall another point from Section 3 that a *je*-clause refers to a set of contentful individuals. For the convenience of the readers, let's repeat the semantics of the embedded *je*-clause of (2a) below.

(16) $\llbracket jeP \rrbracket^{s,s} = \lambda x_e. \text{Contents}(x) = \lambda s'. \text{Anu and Mina used to return home together in } s'$

Now let's turn to the syntax of Bangla *je*-clause. Bayer (1996) resorted to the notion of ARGUMENT SHIFT, which dates back to Hoekstra (1987), in analyzing *je*-clauses. Bangla is an SOV language with its complement CPs base-generating on the left of the verbs. Bayer (1996) maintained this stand in the case of a *je*-clause as well and proposed that the *je*-CP after base-generating on the left undergoes a rightward movement, viz. extraposition. Now the question becomes: what will be the extraposition site for a *je*-clause in syntax? Will it be an IP or a VP? Bayer argued that it would be the VP, not the IP. In favor of this, he provided the following, which says that if it were an IP extraposition, then it would be unclear how the indirect object can bind the pronoun in the IP-extraposed CP:

(51) Bayer (1996)

ami	prottek-Tachele-ke _i	bole-chi	[_{CP} je	Ek-jon ta-ke _i
I	each-CF boy-OBJ	say-PTS1	COMP	one-CF he-OBJ
durgapujo-Y	notun	jama kapoR	debe]	
Durga Puja-LOC	new	clothes	give-FUT3	
'I told each boy that someone will give him new clothes at (the festival of)				
Durga Puja.'				

In the above example, *prottek-Ta chele-ke* and the variable *ta-ke* are co-indexed, hence there must be a c-commanding relation between these two where the former asymmetrically c-commands the latter. Now, a simple IP-adjunction does not work in this regard. Instead, as per Bayer (1996), if we consider a VP-adjunction, then it will make sense: the indirect object after raising to its Case position (for example, [Spec AgrOP]) can easily c-command the CP adjoined to VP.

Bayer also provided another piece of evidence in support of the VP extraposition, with respect to focusing. He argued that the Bangla counterpart of 'only', i.e. *Sudhu* heads a particle phrase (**PrtP**) that occurs VP initially. The

following examples show that *Sudhu* can focus on an arbitrary element of the extraposed CP:

(52) Bayer (1996)

ami	Sudhu	bhebe-chi	[_{CP} je	ROBI	kolkata-Y	giye-chilo
I	only	think-PTS1	COMP	Ravi	Calcutta-LOC	go-PTS3

'I only thought that RAVI went to Calcutta.'

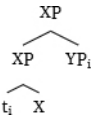
(53) Bayer (1996)

ami	Sudhu	bhebe-chi	[_{CP} je	robi	KOLKATA-Y	giye-chilo
I	only	think-PTS1	COMP	Ravi	Calcutta-LOC	go-PTS3

'I only thought that Ravi went to CALCUTTA.'

The above two sentences tell us that the focus operator *Sudhu* must c-command the focused (marked in capital letters) items in the extraposed CP. If the CP is IP-extraposed, it will pose a problem for us. However, a VP-adjunction analysis can give us a solution. In a nutshell, both the pronominal binding sentence (51) and the focus examples (52-53) tell us that Bangla goes with the VP extraposition of *je*-clauses. Now, let's discuss how the phenomenon of argument shift (cf. Hoekstra 1987) plays a role here. Hoekstra (1987) proposed an alternative theory of extraposition where traces can be deleted if they are no longer required for the Projection Principle. Consider the following structure:

(54)



If the trace gets deleted in the above tree, it seems at first glance that the Projection Principle is violated because there would be nothing for X to discharge its theta-role on. But, a minute observation gives us the thought that there would be no violation of the Projection Principle because YP remains in the projection of X, and if the trace deletes X cannot project XP or, in other words, XP will get pruned to X. Thus, YP will now hold a sisterhood relation with X, and the structure in (54) becomes equivalent to the structure: [_{XP} X YP]. This is the crux of what Bayer (1996) called ARGUMENT SHIFT that converts an extraposed element into a complement. Following Bayer (1996), we assume that the *je*-clause undergoes the argument shift, due to which it gets the status of a complement sitting right to the verb.

Now, turning to the semantics of it, we argue that, in contexts like (2a), the contentful individual denoted by the *je*-clause is not required to always

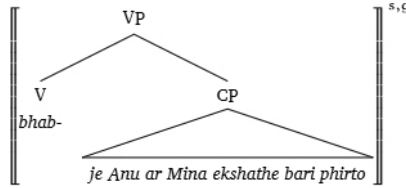
pre-exist the matrix event. In the dementia context, the following will be perfectly appropriate after uttering (2a):

- (55) *Jodio Rabi-ke ba kau-ke e kotha age keu*
 though Rabi-ACC or anyone-ACC this talk before anyone
kokhono bol-e ni.
 ever tell-3 PRF.PST.NEG

‘Though no one ever told this to Rabi or anyone before.’

If it always existed before the commencement of the event of thinking about it, then (55) would have been pragmatically weird after uttering (2a). In other words, (55) sounds okay as a follow-up to (2a) because the use of *bhab-* here is a volunteered-stance one, following Cattell’s (1978) terminology. As Cattell (1978) mentioned, the clauses embedded under volunteered-stance predicates can introduce a new idea to discourse (see also Bogal-Allbritten & Moulton 2019). This is why (55) sounds felicitous after (2a). Keeping this insight in mind, we propose the following composition where the matrix verb in (2a) combines with the *je*-clause by Restrict²² (Chung & Ladusaw 2004), resulting in the following semantics of the VP relative to *s*:

(56)



$= \lambda x \in D_e \lambda y \in D_e \lambda e \in D_v \text{think}_s(e) \wedge \text{Exp}_s(e) = x \wedge \text{Th}_s(e) = y \wedge y$ is contentful
 in $s \wedge \forall s' \in \text{DOX}_{s,s}: \text{Content}_s(y)(s') = 1 \wedge \text{Content}_s(y) = \lambda s''$. Anu and Mina used to
 return home together in s''

(via Restrict, (43) and (16))

Here, the composition goes under the ‘otherwise’ condition of the verbal semantics in (43) because the requirement of the Theme’s always pre-existing matrix event is not applicable in this case. The *je*-clause combines with the verb by restricting its internal argument. Note that the lambda prefix that is being restricted in the verbal predicate becomes last in the lambda sequence just above the eventuality argument (Chung & Ladusaw 2004). Thus, the external argument slot is saturated, and once it gets β -converted by FA, two consecutive ECs (or the polyvalent existential closure) happen to yield the following interpretation of the whole sentence (cf. Chung & Ladusaw (2004) also for the application of polyvalent EC):

- (57) $\exists y \exists e. \text{think}_s(e) \wedge \text{Exp}_s(e) = \text{Rabi} \wedge \text{Th}_s(e) = y \wedge y \text{ is contentful in } s \wedge \forall s' \text{ DOX}_{\text{Rabi},s'}: \text{Content}_s(y)(s') = 1 \wedge \text{Content}_s(y) = \lambda s''$. Anu and Mina used to return home together in s''

The above denotation is simply a belief report, and no factive inferences can be drawn from it because the Content of an entity might not hold in the actual situation. Thus, the truth of the embedded *je*-clause is not exported from (57).

6.1 Factivity with a *je*-clause

Now, let's turn to the context in (3) where the verb *bhab-* gives rise to a factive inference with a *je*-clause as its complement. Hence, the sense of *recall* comes to the fore. We explain this phenomenon by assuming that the clausal complement involved in (3) is not a CP, but rather a DP whose nominal slot is occupied by a phonologically null nominal, viz. $\emptyset_{\text{fact}}$, and the *je*-CP is a complement to the silent noun. We exhibit that the complement clause in (3a) creates an island, blocking the adjunct *wh*-item extraction.²³ See the following sentence that turns out to be ungrammatical under the context of recalling or remembering, but makes sense only in the sense of imagining or thinking. Adjunct extraction in the following results in ungrammaticality in this particular *recall* context.²⁴

- (58) *Kothay_i Rabi bhabchilo [je Anu ar Mina ekshathe t_i phirto]?*

where Rabi think.PROG.PST.3that Anu and Mina together return.HAB.PST.3

‘★Where_i was Rabi recalling [Anu and Mina used to return t_i together]?’

‘✓Where_i was Rabi thinking [Anu and Mina used to return t_i together]?’

This islandhood phenomenon might lead one to predict the presence of some operator in the left periphery of the embedded clause, blocking the adjunct extraction (cf. Melvold 1991; Hegarty 1992; Haegeman 2012, 2014, among many others). However, we argue that such a prediction poses some problems for us: Haegeman (2006), de Cuba (2007) would argue that the *wh*-word that is being extracted from the embedded CP domain is impoverished in comparison to the operator situated at the left periphery of this embedded clause, which is the reason for the ungrammaticality with a recall reading in (58). But we show that even if the *wh*-word is feature-wise rich, we will get the same ungrammaticality.²⁵ See the following, where a D(iscourse)-linked *wh*-word (i.e. rich in its featural content) is involved.²⁶

- (59) *Kon jayga-e Rabi bhabchilo [je Anu ar Mina ekshathe t_i phirto]?
 which place-LOC Rabi think.PROG.PST.3 that Anu and Mina together return.HAB.PST.3
 ‘*Which place_i was Rabi recalling [Anu and Mina used to return t_i together]?’
 ‘✓Which place_i was Rabi thinking [Anu and Mina used to return t_i together]?’*

This unavailability of getting a recall reading, even with a D-lined *wh*-phrase extracted out of the embedded CP domain, tells us that the impoverished left periphery hypothesis does not work for our purpose.

There is other evidence for going against an operator-based approach (Haegeman 2012). In English and Japanese, fronting within a factive complement is banned: that means, embedded topicalization is banned in the case of factive complements. See the following (as stated in Jarrah 2017):

- (60) (Grimshaw 1990)
 *John regrets that this book Mary read.
 (61) (Maki *et al.* 1999)
 John-wa [kono hon-*wa/o Mary-ga yonda no]-o kookaisiteiru.
 John-TOP this book-TOP/ACCMary-NOM read COMP-ACCregret
 ‘John regrets that this book, Mary read.’

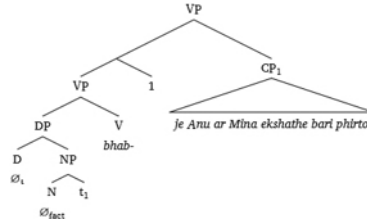
Haegeman (2012) argued that this kind of embedded topicalization is impossible because there is a clause-typing operator present in the left periphery of the embedded clause, which bans arguments from getting fronted. However, Bangla allows such embedded topicalization within a factive CP (cf. Jarrah (2017, 2019) for a similar phenomenon in Jordanian Arabic). Consider the following, where the object argument *gari-ta* ‘the car’ gets topicalized within the embedded clause:

- (62) Context: Rabi was recalling that Anu bought the car that her father was telling him about.
 a. *Rabi bhabchilo [je gari-ta Anu kinechilo.*
 Rabi think.PROG.PST.3 that car-CLF Anu buy.PRF.PST.3
 Lit.: ‘Rabi was recalling that the car, Anu had bought.’

This type of embedded topicalization argues against the presence of a clause-typing operator in the left periphery of factive complements in Bangla, showing that an operator-based approach cannot explain the grammaticality of the data. Instead, if we analyze the complement not as a CP but as a DP – with a null definite determiner and a silent noun modified by the CP (cf. Kiparsky & Kiparsky 1970; Elbourne 2013; Jarrah 2017; Bondarenko

2021) – the well-formedness of (62a) is accounted for, as nothing blocks topicalization of the object within the modifier CP.²⁷ Viewing the complement as a complex DP also explains the unavailability of extraction in a *recall* context, as shown in (58-59), because it shows the COMPLEX DP ISLAND phenomenon Ross (1967) that bans *wh*-extraction out of it. Now, the question that concerns us is about the nature of the silent nominal. Our argument is: with the matrix verb *bhab-* ‘think’, the silent noun will be understood as a *fact*-denoting one (i.e. $\emptyset_{\text{fact}}$) when the extraction is blocked from a bare *jeP* complement (i.e. a *je*-clause complement which is not modified by any overt nominal). See Bondarenko (2021) for the same line of argument for a null ‘fact’ with the Russian verb *objasnit* ‘explain’ embedding a Content of Theme (CT)-CP. We propose the following anatomy of the VP domain of (3a):

(63)



In (63), the CP moves from its base-generated position, i.e. the complement to N, and gets extraposed to the VP, leaving a trace t_i and creating a λ -binder that binds the trace. This extraposition gets us the correct surface order and maintains all the binding relations mentioned above. Elbourne (2013) proposed a similar line of analysis in analyzing the data as follows: *Bill resents it that people are always comparing him to Mozart*. Thanks to one of the reviewers for pointing this out to us. However, there will be a structural difference between Bangla and English: in English, due to the normal phonological requirements of pronouns, the NP complement of *it* must be unpronounced, and thus it raises and adjoins to the DP, whereas in Bangla, it is not the DP adjunction, but rather a VP-adjunction.

Additionally, it is to be noted that the definite D in (63) can have a phonological realization with the definite DP *eta*, which is a counterpart of *it* (64a). But there is also a divergence from English. In English, only factives like *regret*, *resent*, *like*, *love*, etc. allow for this ‘S V_{att} it that...’ constructions, but not the semi-factives (like *know*, *realize*) and non-factives (like *believe*, *think*) (see Elbourne 2013). By contrast, in Bangla, the ‘S *eta* V_{att} that...’ construction can be noted even with non-factives (65a).

(64) Context: Rabi was recollecting/reminiscing that Anu and Mina used to return home together regularly. He remembered their friendship.

- a. *Rabi eta bhabchilo je Anu ar Mina ekshathe*
 Rabi it think.PROG.PST.3 that Anu and Mina together
bari phirto.
 house return.HAB.PST.3

‘Rabi was thinking (*it) that Anu and Mina used to return home together.’

(65) Context: Rabi imagines that Anu and Mina used to return home together.

- a. *Rabi-r eta mon-e hoy je Anu ar Mina ekshathe*
 Rabi-GEN it mind-LOCappen.PRS.3that Anu and Mina together
bari phirto.
 house return.HAB.PST.3

‘Rabi thinks (*it) that Anu and Mina used to return home together.’

Now, getting back to the composition, we define the semantics of the definite D and the silent *fact* as follows:

$$(66) \llbracket D_{\phi} \rrbracket^{s,g} = \lambda P_{\langle e,t \rangle} . \iota x_e P(x)$$

$$(67) \llbracket \emptyset_{\text{fact}} \rrbracket^{s,g} = \lambda y_e . \text{fact}_s(y)^{28}$$

The definite D takes a property *P* of type $\langle e,t \rangle$ and returns the unique *e*-type entity *x* such that *x* has the property *P*. And, (67) refers to the set of individuals that are facts in the situation of evaluation. We sketch the following compositions till the node DP:

$$(68) \llbracket \text{NP} \rrbracket^{s,g} = \lambda y_e . \text{fact}_s(y) \wedge g(1)(y) \quad (\text{by Predicate Modification (PM), N and } \langle e,t \rangle \text{-type trace})$$

$$(69) \llbracket \text{DP} \rrbracket^{s,g} = \iota x_e . \text{fact}_s(x) \wedge g(1)(x) \quad (\text{by FA, D and NP})$$

Recall from (16) that a *je*-clause is of type $\langle e,t \rangle$. Since the extraposition is a vacuous movement, the trace will also be of type $\langle e,t \rangle$, and the binder that binds the trace will have the equivalent type designation. It is compositionally evident that the DP denotes a unique, maximal entity that is a fact. We argue that this *e*-type fact saturates the Theme argument of *bhab-* ‘think’. Note that this DP contains a predicate *g*(1) which is co-indexed by the extraposed CP that also has a predicate-like denotation. And, since the CP refers to some events in the past, the DP will refer to a unique fact that denotes some events that happened in the past. Now that the DP is a fact referring to some past events, it is reasonable to argue that it will always exist before the event of thinking. This is why the following is pragmatically inappropriate as a follow-up to (3a) because there will not be any cases where the fact DP does not pre-exist the matrix event:

- (70) *Kintu Anu Ar Mina-r ekshathe bari pher-a-r kono*
 but Anu and Mina-GEN together home return-GER-GEN any

ghotona age kokhono ghot-e ni.
 event/fact before ever happen-3 PRF.PST.NEG
 ‘But, there happened no such events of Anu and Mina returning home together.’
 (* after (3a))

Thus, compositionally, the VP will get the following interpretation, relative to situation s and a variable assigner g :

- (71) $\llbracket \text{VP} \rrbracket^{s,g} = \lambda x \in D_e \lambda e \in D_v \text{think}_s(e) \wedge \text{Exp}_s(e) = x \wedge \text{Th}_s(e) = \iota y. \text{fact}_s(y) \wedge \text{Content}_s(y) = \lambda s'. \text{Anu and Mina used to return home together in } s'$
 given, $\text{LB}(\tau(\iota y. \text{fact}_s(y) \wedge \text{Content}_s(y) = \lambda s'. \text{Anu and Mina used to return home together in } s')) <_{\text{always}} \text{LB}(\tau(e))$

In (71), the given criterion resembles the PRE-EXISTENCE PRESUPPOSITION that is linked to the Theme or internal argument of the attitude predicate (cf. Bondarenko 2020). It tells us the left boundary (LB) of the internal argument, denoting the lifespan of the unique fact, always precedes that of the running time of the event of thinking. In other words, in a *recall* context, *bhab-* ‘think’ requires its Theme to pre-exist the event of thinking. Now the attitude subject will saturate the external argument slot, and the event argument will be existentially closed off. The above interpretation of VP is factive in nature because the object of thinking is something that is a fact, i.e. true in the actual situation. In this context of the discussion, we must mention that the pre-existence criterion does not guarantee the truth of the complement, but what it does is introduce a flavor of familiarity that tells us only about the existence of some entity before the matrix event starts to happen. Consider the following, where the existence of a *rumor* is presupposed:

- (72) Context: There is a rumor that Anu used to return home with Mina. Rabi was recalling that.

a. Rabi oi gujob-ta bhabchilo je Anu ar Mina
 Rabi DEM.DISTRumor-CLF think.PROG.PST.3 that Anu and Mina
 ekshathe bari phirto.
 together house return.HAB.PST.3
 ‘Rabi was recalling/remembering the rumor that Anu and Mina used to return home together.’

Though no truth of the CP is entailed in (72), it comes up with a RECALL reading where a rumor indeed exists before the event of thinking of it.²⁹ Therefore, we contend that for a RECALL interpretation, which is a presuppositional one, the Theme or object of *bhab-* always pre-exists the matrix event. It also goes in favor of Cattell’s (1978) idea that presuppositional verbs select for those complements that already exist in the COMMON GROUND (CG) (see

Stalnaker 2002). In (72), too, the *rumor* is an entity that is already an existent one in the CG. However, the Content of it does not hold in the actual situation. The following is the takeaway from §6.1:

INTERPRETATIONS OF <i>bhab-</i> ‘think’	PRE-EXISTENCE OF THEME/OBJECT ALWAYS
Recall	Yes
Think	No

Table 2. Different Interpretations of *bhab-* ‘think’ and the status of its Theme/Object.

Now, let’s move on to the next section, which deals with how factivity is generated while *bhab-* embeds a gerundial complement.

7. Factive reading with a gerundial complement

We have already shown that *bhab-* ‘think’ has a factive avatar with a gerund as its complement. See (2c). A relevant question that can arise at this point is whether the gerund encodes factivity in itself. However, this is not a feasible path to follow. See the following example in (73) where the contradictory *but*-conjunct is compatible with the preceding clause. Hence, no factive inference is drawn.

- (73) *Rabi* [Anu-r vote-e jet-a] *asha* *korechilo*, ✓*kintu*
Rabi Anu-GEN vote-LOC win-GER hope do.PRF.PST.3 but
durbhagyoboshoto *Anu* *konodino* vote-e jet-e *ni*.
 unfortunately Anu ever vote-LOCwin-3 PRF.PST.NEG
 ‘Rabi hoped for Anu to win elections, but unfortunately, she never won any.’

There can also be instances where a definite gerund as a complement does not end up having a factive interpretation. See the following, which is uttered in a context where Anu won several times, but each time with fraud:

- (74) *Amra* [Anu-r *shei* jet-a-gulo-i] *asha* *korechilam*
 we Anu-GEN DEM.DISTC win-GER-CLF-FOC hope do.PRF.PST.1
je-gulo-te *kono* *jocchuri* *nei*.
 REL-CLF-LOC any fraudulencebe.NEG
 ‘We hoped for those winning events of Anu where there are no cases of fraud.’

The above attitude report is clearly non-factive because Anu's trickery-free winning events do not exist. Thus, the following *but*-clause is compatible with it:

- (75) *Kintu o ekbaro shotbhabo jet-e ni.*
 but she not.even.once honestly win-3 PRF.PST.NEG
 'But, not even once did she win honestly.'

We also argue in favor of the fact that the gerundial complement in (74) is definite because the distal demonstrative *shei* and the definite plural classifier *-gulo* are involved. See the following, where the inclusion of these two makes a bare noun definite:

- (76) Context: You and I saw a group of three people at a wedding invitation last month [anaphoricity]. The people were dancing. Yesterday, you saw the unique group of them on your way to school [uniqueness]. You reported this to me. → Definiteness
- a. *Ami shei lok-gulo-ke dekh-lam.*
 I DEM.DIST people-CLF-ACC see-PST.1
 'I saw those people.'
- b. **Ami kichu lok-ke dekh-lam.*
 I some people-ACC see-PST.1
 '*I saw some people.'

Despite having a definite gerund as the complement, *asha kor-* 'hope' in (74) does not come up with any sort of factive inference. It challenges the view of Kastner (2015), Hanink & Bochnak (2017), who correlated factivity with definiteness.³⁰ We have shown that neither a bare gerund nor a definite gerund can be liable for factivity. It means that there must be something else that is at play in this regard.

So, let's now dive into seeing how the factive reading gets surfaced in the example in (2c). We argue that the definite gerundial complement is composed with *bhab-* as its Theme argument in this case. We propose the VP structure of (2c) as follows:

- (77)
-
- ```

graph TD
 VP --> DP
 VP --> V
 DP --> Sentence["Anu ar Mina-r ekshathe bari pher-a-gulo"]
 V --> bhab["bhab-"]

```

We also argue that this gerund DP always pre-exists the concerned attitude event because, as per native judgments, (70) always sounds weird after uttering (2c). Now focusing on our compositions, we state that the following denotation relative to a situation  $s$  and assignment function  $g$  results in, after the verb combines with the gerundial DP:

- (78)  $\llbracket \text{VP} \rrbracket^{s,g} = \lambda x \lambda e \text{ D}_e \lambda e \text{ D}_v \text{think}_s(e) \wedge \text{Exp}_s(e) = x \wedge \text{Th}_s(e) = \text{ie.}[\cup \cap (\lambda e_k [\cup \text{returning}_s(e_k) \wedge \text{Ag}_s(a + m, e_k) \wedge \text{Loc}_s(h, e_k) \wedge \text{together}_s(e_k)])(s)(e') \wedge \neg \text{AT}_s(e')]$   
 $\text{given, LB}(\tau(\text{ie.}[\cup \cap (\lambda e_k [\cup \text{returning}_s(e_k) \wedge \text{Ag}_s(a + m, e_k) \wedge \text{Loc}_s(h, e_k) \wedge \text{together}_s(e_k)])(s)(e') \wedge \neg \text{AT}_s(e')])) <_{\text{always}} \text{LB}(\tau(e))$

Now the external argument is saturated, and the event argument gets closed off, as before. The denotation in (78) gives rise to a factive inference. It is inferred that the maximal plurality of all the events of Anu and Mina returning home together is the object of the event of thinking in  $s$ . This gives us a veridical flavor,<sup>31</sup> and the pre-existence condition of the Theme tells us that the attitude report is not only veridical but additionally is a factive one because even if we negate (2c), it entails that the maximum plurality of the events of Anu and Mina returning home together pre-exists the matrix event. This is the reason why the following ‘in fact’-clause sounds inappropriate as a follow-up to the negation of (2c) in every possible scenario. See the sentence below where the gerundial complement carries the main sentential stress/focus on it:

- (79) *Rabi* [Anu ar Mina-r ekshathe bari pher-a-gulo]  
 Rabi Anu and Mina-GENtogether house return-GER-CLF  
*bhabchilo na, bhabchilo onyo kichu.*  
 think.PROG.PST.3 NEG think.PROG.PST.3else something  
 \*ashole Anu Ar Mina-r ekshathe bari pher-a-r kono  
 in fact Anu and Mina-GEN together home return-GER-GEN any  
*ghotona age kokhono ghot-e ni.*  
 event/fact before ever happen-3 PRF.PST.NEG  
 ‘Rabi was not remembering/recalling Anu and Mina’s returns to their house together; he was remembering something else. \*In fact, there happened no such events of Anu and Mina returning home together happened.’

At this point, one might ask what is then going on in the cases of (73-74). Does not the gerund combine with the verb as its Theme in these cases? Following Banerjee (2023a), our answer will be no. Banerjee (2023a) argued that if composed with the verb as its Theme/internal argument, we would get a veridical attitude report, but this is not the case: see (74) where the truth of the gerund DP can easily be defeated, and so is the case with (73) where it is meant that there are no winning events of Anu without trickery. Following

Banerjee's (2023) insight, we argue two things: (i) that these gerundial DPs are not the OBJECTS of hoping events, but rather they denote Contents of them; (ii) these are not DPs, but some eventive projections  $\epsilon$ Ps in disguise whose  $\epsilon$  head has the semantics as follows:

$$(80) \llbracket \epsilon \rrbracket^{s,g} = \lambda P_{\langle v,t \rangle} \lambda e_v. \text{Content}_s(e) = \lambda s'. \exists e'. P(e') \text{ in } s'$$

This head is a Content-introducing one that takes a gerundial DP, which is a property of a  $v$ -type event, and returns a set of contentful events such that the Content of them denotes the proposition that is obtained by existentially closing off the event argument of the gerund DP. We also argue that this eventive head has a  $[uD]$  feature, due to which it merges with the gerund DP.<sup>32</sup> Let's take the case in (73). After the  $\epsilon$  head merges with the gerund DP by FA, we get the following:

$$(81) \llbracket \epsilon P \rrbracket^{s,g} = \lambda e_v. \text{Content}_s(e) = \lambda s'. \exists e'. e' \text{ is an event of Anu winning elections in } s'$$

This denotes a set of contentful events whose Content is a propositional element of type  $\langle s, t \rangle$ . Note that the event that is existentially bound can be atomic or non-atomic. In (74), the event will be a non-atomic one. Now, following Banerjee (2023a), we argue that this  $\epsilon$ P combines with the predicate *hope* (82) by the rule of Modified Predicate Modification<sup>33</sup> (MPM) (cf. Bondarenko 2019a).<sup>34</sup> See below:

$$(82) \llbracket \text{asha kor-} \rrbracket^{s,g} = \lambda y \in D_e \lambda x \in D_e \lambda e \in D_v. \text{hope}_s(e) \wedge \text{Exp}_s(e) = x \wedge \text{Th}_s(e) = y$$

$$(83) \llbracket \epsilon P + \text{asha kor-} \rrbracket^{s,g} = \lambda y \in D_e \lambda x \in D_e \lambda e \in D_v. \text{hope}_s(e) \wedge \text{Exp}_s(e) = x \wedge \text{Th}_s(e) = y \wedge \text{Content}_s(e) = \lambda s'. \exists e'. e' \text{ is an event of Anu winning elections in } s'$$

The rule Modified Predicate Modification allows any predicate of type  $\langle \sigma_k, t \rangle$  to modify any argument that is of type  $\sigma_k$ . Thus, the event argument of  $\epsilon$ P modifies the matrix event in (82). Now, the internal argument will be closed off so that the external argument  $x$  can get its value from the subject. Afterward, another  $\exists$ -closure will happen to close the event argument so that we can get the following expression of type  $t$ :

$$(84) \exists y \exists e. \text{hope}_s(e) \wedge \text{Exp}_s(e) = \text{Rabi} \wedge \text{Th}_s(e) = y \wedge \text{Content}_s(e) = \lambda s'. \exists e'. e' \text{ is an event of Anu winning elections in } s'$$

The propositional argument becomes the Content of the 'hope' event; thus, it can be false in the actual situation because the Content of an eventuality might not be true in reality. So the generalization is: if there are no veridical inferences, the gerund does not combine with the predicate as its Theme; instead, it modifies the matrix attitude event. The idea of introducing the eventive projection over the gerund DP in examples like (73) is a bit stipula-



tive. But this stipulation, we argue, is correct because it can logically capture the lack of factivity.

## 8. Conclusion

This paper examines factivity alternations of the Bangla verb *bhab-* ‘think’ with various complements. The verb is factive with gerundive complements but not with *bole*-clauses, and shows optional factivity with *je*-clauses depending on the temporal relation between the matrix and embedded events. Thus, factivity is not a fixed property of predicates. We argue that *bhab-* is OPTIONALLY FACTIVE (Degen & Tonhauser 2022), projecting its complement content only occasionally. Our study also raises objections to the concept of building any natural class of factive predicates. See also Degen & Tonhauser (2022), who claim that the projection of clausal complements or both projection and entailment of clausal complements cannot help us identify a class of factive verbs. Their experimental study points toward the fact that there are either no factive verbs or the verbs that are called factive are heterogeneous with respect to projection.

This paper examined gerunds, classifier roles, and the hybrid system of Bangla complementizers, focusing on two finite clause types and their behavior at the syntax-semantics interface. We argue for a theory of factivity based on distinct compositional paths depending on complement type, aligning with findings in Turkish (Özyıldız 2017) and Buryat (Bondarenko 2020). Mention of different meanings due to different complements is already prevalent in literature. Bogal-Allbritten (2016) showed that a Navajo *nisin*-sentence gets its meaning depending on the meaning of the embedded clause. It has a very generic attitude that can get interpretations such as *know*, *want*, based on the nature of the modal operator (i.e. whether it is EPIstemic or DESire) in the embedded clause. However, unlike *nisin*, our *bhab-* cannot give rise to such a wide array of interpretations, though the change in the meaning of attitude reports due to the silent *fact* in the embedded domain in *recall* contexts points to the role of the morpho-syntax of embedded clauses, as what can be noted in Navajo too. Also, some literature mentions the relevance of different compositional routes between verbs and their complements. See, for example, Deal (2018) where a *de re* reading in Nez Perce can be obtained via three ways: (i) by prolepsis where the ACC-marked proleptic object is base-generated at a designated *res* position in the matrix clause; (ii) by covert raising where the ERG-marked subject of the embedded clause covertly moves to the matrix *res* position; and (iii) by concept generation as in English. Readers are also referred to Bryant & Bhadra (2021), where different compositional paths are booked

for different sizes of complements. They showed that Oromo *aman-* ‘believe’ combines with verbal nominalizations with subjects and *akka* constructions in two ways: verbal nominalizations are composed with attitudes by FA, whereas *akka* constructions take the path of Restrict, which our *je*-clause also follows in non-factive contexts. Our nominalizations are also shown to take the route of FA while composing with *bhab-*. When our path is of modification or a mere restriction, we argue that there are no chances of getting factive inferences with *bhab-*. By contrast, there are chances for factive inferences to pop up when the internal argument of this verb gets saturated by its complement.

While our findings align broadly with claims for Turkish and Buryat, Bangla shows key divergences. In those languages, composition with finite CPs tends to yield non-factivity in verbs showing factivity alternation. In Bangla, however, the pattern is more complex. In our language, we notice a hybrid system of complementizers, which we assume creates complexity in this regard. That kind of CP, which involves a clause-final complementizer, always takes the path of modification, giving rise to no factive inference. In this regard, these CPs are kind of similar to the Turkish *diye*-clause and Buryat *gəžə*-clause denoting contentful eventualities. However, Bangla has another type of finite clause with the clause-initial complementizer, i.e. *je*-clause that are contentful individuals, but not eventualities. This is a crucial divergence that Bangla takes from those languages mentioned above. In those languages, contentful individuals are referred to by nominalized CPs that have nominal morphology like Case. But, in Bangla, a *je*-clause cannot be claimed to be a nominalized CP because it can never carry Case morphology. A *je*-clause cannot even occupy the subject position of a sentence ever. We have shown that this type of clause does not modify the matrix event; rather, it restricts the internal argument of the matrix event. But, within a factive context, we argue that this clause is not a bare CP, but a DP in disguise which has a definite determiner and a silent fact nominal. While in factivity alternation cases, both Turkish and Buryat do not ascribe factivity lexically either on verbs or on their complements, we cannot claim exactly the same in our case of Bangla. While we argue against exporting factivity directly from verbs, the explanation behind getting factivity with a *je*-clause reminds us of the Kiparskian (Kiparsky & Kiparsky 1970) standpoint, where factive inferences can be extracted from complements.

In a nutshell, we adopt a hybrid view of factivity, arguing that while Bangla largely supports a compositional approach, it also shows cases where factivity arises from complements. Future work could explore factivity-altering verbs in other languages to examine their interaction with complementation. Such a cross-linguistic study may enrich our typological understanding of factivity.

## Appendix

Bangla has other verbs like *mone ho-* and *mone por-* used for *think* and *remember*, respectively. In this section, we compare *bhab-* with these two related verbs. Let us look at the former first and see what its argument structure looks like. Consider the following:

- (85) \**Rabi-r*    [*Anu-r*    *vote-e*    *jet-a*]    *mone*    *hoy.*  
          Rabi-GEN    Anu-GEN    vote-LOC    win-GER    mind.LOC    happen.PRS.3  
          ‘\*Rabi thinks Anu’s winning the election.’
- (86) *Rabi-r*    *mone*    *hoy*    *je*    *Anu*    *vote-e*    *jitbe.*  
          Rabi-GEN    mind.LOC    happen.PRS.3    that    Anu    vote-LOC    win.FUT.3  
          ‘Rabi thinks that Anu will win the election.’
- (87) *Rabi-r*    [*\*maa-ke/*    ✓*maa-er*    *kotha*]    *mone*    *hoy.*  
          Rabi-GEN    mother-ACC    mother-GEN    talk    mind.LOC    happen.PRS.3  
          ‘\*Rabi thinks his mother./✓Rabi thinks about his mother.’

(85) exhibits that the verb *mone ho-* cannot take a gerund. We explain this by saying that this verb cannot take an eventuality as its Theme. It cannot take a non-contentful DP either. See (87) where the non-contentful object *maa-ke* leads to ungrammaticality. However, when the object is replaced with *maa-er kotha*, which is a contentful one because it is associated with some propositional content, it perfectly fits in the structure. Although this is syntactically a DP, we argue that it refers to some propositional substance because it denotes some ‘things’ that are related to the attitude subject’s mother. These ‘things’ are clearly propositional in nature. (86) is also grammatical because the complement is syntactically a CP, i.e. a proposition. Therefore, we can conclude that this verb cannot take anything that is not propositional in nature. Thus, we define the following semantics for it:

- (88)  $\llbracket mone\ ho- \rrbracket^{s,g} = \lambda y \in De \lambda x \in De \lambda e \in D_v: \underline{y\ is\ contentful}.think_s(e) \wedge Exp_s(e) = x \wedge Th_s(e) = y$

It says that *mone ho-* is defined if the internal argument/Theme of it is contentful in nature. This semantics, we argue, can account for the ungrammaticalities mentioned above.

On the other hand, *mone por-* takes events, propositions, and non-contentful entities/individuals as complements. See the following:

- (89) *Rabi-r*    [*Anu-r*    *vote-e*    *jet-a*]    *mone*    *pore.*  
          Rabi-GEN    Anu-GEN    vote-LOC    win-GER    mind.LOC    fall.PRS.3  
          ‘Rabi recalls an event where Anu won an election. [gerund complement ✓]’

- (90) *Rabi-r mone pore je Anu vote-e jitechilo.*  
 Rabi-GEN mind.LOC fall.PRS.3 that Anu vote-LOC win.PRF.PST.3  
 ‘Rabi recalls that Anu had won the election.’ [propositional complement ✓]

- (91) *Rabi-r [maa-ke/ maa-er kotha] mone pore.*  
 Rabi-GEN mother-ACC mother-GEN talk mind.LOC fall.PRS.3  
 ‘Rabi recalls his mother.’ [non-contentful DP complement ✓]

‘Rabi recalls stuff about his mother.’ [contentful DP complement ✓]

We also argue that the Theme of this verb is required to pre-exist the starting point of the attitude event (Banerjee *et al.* 2019; Banerjee & Karmakar 2020; Banerjee 2023a). Supporting data is the following:

- (92) *Amar [maa-ke mone pore, \*kintu maa age*  
 I-GEN mother-ACC mind.LOC fall.PRS.3 but mother before  
*konodino kothao chilo na.*  
 ever anywhere was NEG  
 ‘I recall my mother, \*but my mother did not exist anywhere ever before.’

These observations lead us to claim the following semantics of *mone por-* ‘think’:

- (93)  $\llbracket \text{mone por-} \rrbracket^{\text{sg}} = \lambda y \ D_e \cup D_y \lambda x \ D_y; \underline{\text{LB}(\tau(y))} < \text{LB}(\tau(e)).\text{remember}_s(e) \wedge \text{Exp}_s(e) = x \wedge \text{Th}_s(e) = y$

Like *bhab-*, this verb also takes its internal argument from the domain of eventualities or the domain of entities (Banerjee 2023a). But, unlike *bhab-*, it always requires its Theme to exist before the matrix event starts.<sup>35</sup> This explains why, when embedding a gerund or a nominal-like *je*-clause, the verb yields a clear RECALL reading and never denotes THINK. Since the pre-existence of its Theme is built into its semantics, *mone por-* often gives rise to factivity when selecting a complement. In contrast, *mone ho-* does not require the Theme to pre-exist and thus consistently expresses a THINK reading, without triggering factivity. Unlike *bhab-*, *mone ho-* always requires its Theme to be propositional in nature.

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## Note

<sup>1</sup> Bangla, also known as Bengali, is an Eastern Indo-Aryan language primarily spoken in West Bengal, a state in India, and Bangladesh.

<sup>2</sup> We did not use IPA while transcribing the Bangla data. Instead, a plain Roman script is used for transcription. In glossing, we strictly followed the standard Leipzig glossing convention. Regarding the data and glosses taken from other sources, we retained them in their original form.

<sup>3</sup> This factive RECALL sense of *bhab-* with a *je*-clause in this example is only felicitous in a context that overtly describes some actual memories. In any other situation *bhab-* + *je*-clause combination gives the THINK reading only. Thanks to one reviewer for pointing this out. We will later show that the RECALL sense with a *je*-clause is syntax-sensitive too. Also, throughout the paper, we used all the cognates of *remember*, viz. *recall*, *recollect*, and *reminisce* in a factive sense, while *imagine*, *think* are used in a non-factive sense.

<sup>4</sup> One anonymous reviewer questioned whether one should not think that *bhab-* + *je* is simply underspecified concerning veridicality/factivity. To answer this, we argue that the underspecified thing should be booked for non-factivity. In our case, *bhab-* + *je*-clause combination can be both factive and non-factive if used in appropriate contexts. But it is not only pragmatically determined. We show in §6 that the complement sizes differ in both these readings. In the non-factive reading, the *je*-clause is a mere CP, whereas in the case of factive sense, the *je*-clause is hidden under a DP. So, the factive/non-factive variation with *je*-clauses is also syntax-sensitive.

<sup>5</sup> This clause-final complementizer is termed as quotative because it can host direct quotes. See the example below:

- (i) *Rabi*            *“ami more jacchi”*            *bole*    *chitkar korlo.*  
       *Rabi*        *I*        *die*        *go.PROG.PRS.1*    *BOLE*    *scream do.PST.3*  
       ‘Rabi screamed, “I am dying”.’

<sup>6</sup> See Kidwai (2014) for another approach that does not view *bole* as a complementizer.

<sup>7</sup> One reviewer asked about the status of the *s'* in (15). This lambda *s'* we argue, is used for abstracting over the situation of the TP.

<sup>8</sup> After the situation-abstraction step, the intensional interpretation of the TP will be the following:

- (i)  $\llbracket \text{TP} \rrbracket_s^\# = \lambda s'. \text{Anu and Mina used to return home together in } s'.$

The denotation of *je* relative to a situation *s* looks like (14), where it takes a propositional argument of type  $\langle s, t \rangle$ , which the intensional version of the TP refers to. This is the reason we used the Intensional Functional Application because the complementizer, as its first argument, carries an intensional element, i.e. a proposition.

<sup>9</sup> A same kind of predicate-like denotation is reported in the case of Laz *na*-clauses (cf. Demirok *et al.* 2019).

<sup>10</sup> As mentioned in Moulton (2018), Patrick Elliot (UCL, handout) suggests that C cannot be the content function. This function is located higher than the C. Look at the following:

(i) *Pat made the claim that John is a fraud and Mary is pregnant.*

If *that* acts as the content function, the denotation of the embedded clause would be as below:

(ii)  $\lambda x_e. \text{Content}(x) = \lambda s'. \text{John Is fraud In } s' \wedge \text{Content}(x) = \lambda s''. \text{Mary Is pregnant in } s''$

But these two propositions are not identical. Based on this observation, Elliott proposes *that* is different from what is called the content function. But, this cannot be the case with Bangla. Bangla *je* is not like *that* in this regard. See the following ungrammaticality:

(iii) *Rahul dabi korechilo je Robi ekjon thog ebong (\*je) Anu shontanshombhoba.*

Rabi claim do.PRF.PST.3 that Rabi one fraud and that Anu pregnant

Intended: Rahul claimed that Rabi is a fraud and that Mary is pregnant.

It suggests that in a single embedded environment, two different *je*-clauses cannot be conjoined. Thus, viewing *je* as the Content function does not face the problem Elliott raises.

<sup>11</sup> Following Kratzer (2006), Hacquard (2006), and Moulton (2009, 2015), Elliot (2017) assumed that the set of contentful items includes not only the abstract objects like *facts*, *theories*, etc., but also the eventualities such as *saying events*, *belief states*, and so on.

<sup>12</sup> Thanks to one of the anonymous reviewers, we checked if there could be any evidential link that *bole* bears. Following Kidwai (2014), the answer is yes; it does carry something of this sort historically, and it merges in the domain of indirect evidence, which is at the edge of the vP. The reviewer also suggested comparing the Bangla hybrid complementizer system with Dierck's (2013) reported evidential properties of Lubukusu (a Bantu language spoken in Kenya) complementizers. To answer her/his question, we argue that it is not identical between these two languages. Dierck (2013) reported that Lubukusu has two complementizers: one is agreeing *ali* and the other is non-agreeing *bali*. It is reported that "when the subject of the sentence is the source of the information reported in the embedded clause, the agreeing complementizer is used, and the non-agreeing *bali* is impossible", and "when the subject of the sentence is not the source of the information of the reported event, and as such *bali* is possible and *ali* is not." However, Bangla does not follow this. See the following:

(i) *Moses Sammy taka-ta churi koreche bole janiyeche.*  
Moses Sammy money-CLF steal do.PRF.PRS.3 BOLE inform.PRF.PRS.3

'Moses informed that Sammy stole the money.'

✓Context a: Moses saw the event, and the speaker believes him.

✓Context b: Moses did not see the event but reported what people had informed him.

✓Context c: Moses says he saw the event, but the speaker doesn't believe him.

As reported by the native speakers, in the above three contexts, the following with an embedded *je*-clause can also be apt as well:

(ii) *Moses janiyeche je Sammy taka-ta churi koreche.*  
Moses inform.PRF.PRS.3 that Sammy money-CLF steal do.PRF.PRS.3

'Moses informed that Sammy stole the money.'

Thus, *bole* can be used when the attitude subject himself is the source of information (like Context a), and the complementizer *je* can be used even when the subject is not the source of the information (like Context b). Now, coming to the speaker's perspective, Dierck (2013) reported that if the speaker doubts the information given by the embedded clause, *ali* cannot be used at all. It is only *bali* which is used in this scenario. But, in Bangla, we get either of the complementizers used when the speaker

doubts the embedded information. See the following, where (v) sounds perfectly okay after (iii) and (iv):

- (iii) *Moses Sammy taka-ta churi koreche bole shuneche.*  
Moses Sammy money-CLF steal do.PRF.PRS.3 BOLE hear.PRF.PRS.3  
‘Moses heard that Sammy stole the money.’
- (iv) *Moses shuneche je Sammy taka-ta churi koreche.*  
Moses hear.PRF.PRS.3 that Sammy money-CLF steal do.PRF.PRS.3  
‘Moses heard that Sammy stole the money.’
- (v) *Kintu, amar e-te shondeho ache.*  
but I.GEN this-LOC doubt have  
‘But, I have doubts about it.’

What we will argue for Bangla complementizers is that they are not explicitly associated with any sort of evidential properties, like Lubukusu complementizers show. The complementizer *bole* is historically related to a report verb, but it has semantically bleached over time. Thus, it does not carry any explicit semantics of SAY at present. It only corresponds to an overt realization of what Kratzer (2013) called a covert reportative modal.

<sup>13</sup> See Bossi (2023) for a similar test in Kipsigis.

<sup>14</sup> One reviewer questioned about the tests in (19-20) and mentioned that there are ways of “saying p” that do not involve actual utterances (could be thoughts), and in English, you can say “The computer says that your name isn’t in the database,” but would not conclude that “say” does not mean “say”. To answer this question, we argue that the data in (19-20) are used in the sense that, with the use of the *bole* complementizer, one does not necessarily get the direct speech semantics in it. A language like Turkish has a *say*-based complementizer, viz. *diye*, which has overt speech semantics in it. Please refer to the work of Özyıldız *et al.* (2019), where in the semantics of *diye* one can find the component *say(e)* explicitly. See page 302 of this paper, where the event of saying is done by some contextually valued agent *g(n)*. This sort of say-semantics is not present in Bangla. And those two data spoke in favor of this fact only. Instead, the say-semantics gets bleached (change in F-value, loss of external argument) and only carries the Kratzerian semantics of the reportative modal [[SAY]]. Also, the reviewer asked whether there is a contrast between ‘My cat *b<sup>h</sup>ab-* + *je* we’re going to the vet’ vs ‘My cat we’re going to the vet *bole* + *b<sup>h</sup>ab-*’. To answer this, there is no contrast between these two. Both are similar in Bangla.

<sup>15</sup> Though Bayer (1996: 273) mentions that the pre-verbal *bole*-clause shows scope ambiguity with *wh* in it, we do not agree with this claim. We argue that *ora [ke aSbe bole] Suneche* gives us only the reading like ‘Who have they heard will come?’, but never something like ‘They have heard who will come.’ (see Banerjee 2023b).

<sup>16</sup> Unlike Bangla, English gerunds do not attach with classifiers because it is not a classifier language. There are other differences also. English has the ACC-ing gerunds (like *I was remembering Anu and Mina coming back home together*), while Bangla lacks it clearly (see Bhattacharya 2000). Bangla only has POSS-ing and PRO-ing types of gerunds. An anonymous reviewer asked whether the Bangla gerunds are different from English gerunds in how they participate in the truth conditions of attitude reports. To answer this query, we argue that in English, *Ram does not remember Anu visiting Delhi* (ACC-ing as a complement) is not necessarily factive; but in Bangla, *Ram-er Anu-r Delhi jawa mone pore na* ‘Ram does not remember the event of Anu’s visiting Delhi’ is necessarily factive.

<sup>17</sup> One of the reviewers mentioned the following data and asked how the classifier,



in this case, can take care of atoms:

- (i) *Ram-er* [*Sita aar Laxman-er* baar baar/ roj roj *ekshathe* phera] -ta  
 Ram-GEN Sita and L.-GEN frequently everyday together return-GER-TA  
 none pore.  
 mind fall

‘Ram recalls Sita and Laxman returning together frequently/every day.’

We totally agree with the reviewer that *-ta* refers to the whole definite set and not one single event. Due to the frequency adverb, the gerund refers to a set of consecutive returning events. Now, what we need to do is put this set in another set, making a singleton (by type-shifting using Partee’s (1986) IDENT) that looks like  $\{\{e_1, e_2, \dots, e_n\}\}$ . Now, *-ta* can easily single out the set of events from the singleton. In this line of the discussion, we need to mention that the notion of atoms is not a strict one; rather, atoms can be unstable as well (Chierchia 2010). Here, we claim that the set of events  $\{e_1, e_2, \dots, e_n\}$  should be considered an unstable atom in the singleton. In this sense, when *-ta* extracts it from the singleton, it extracts nothing but an atom. This explanation gets a strong footing when several Bangla native speakers confirm that the gerund [*Sita aar Laxman-er* baar baar/roj roj *ekshathe phera*] is not compatible with the plural classifier *-gulo*. This is because the plural classifier *-gulo* extracts things that are non-atomic. Now, if a set contains only one atom, *-gulo* cannot act upon it.

<sup>18</sup> We are following von Stechow & Heim (2011) in viewing determiners as world/situation-independent.

<sup>19</sup> An anonymous reviewer asked why we introduced ‘always’ in our pre-existence presupposition. We argue that the term ‘always’ is important here because the Theme of the non-factive *think* need not ‘always’ exist beforehand, whereas that of a factive verb needs instead. One can get an example of *bhab-* in the sense of non-factive *think*, where the complement of it may be spoken by some other person at some point in the past. In such a scenario, we cannot say that a REMEMBER-reading will come to the fore. Therefore, the Theme of *bhab-* has to precede it always to give us a REMEMBER/RECALL reading. In Bondarenko’s (2019a,b) *hanaxa*, the pre-existence presupposition states that every time it takes a DP, it pre-exists the matrix event and gives us the REMEMBER-reading, which is not the case in Bangla. In Bangla, we can have a DP-correlate (expletive) of a clausal complement of *bhab-*, where no such REMEMBER-reading comes to the fore. For example, in Bangla, ‘*Ram eta* (it) *bhabchilo* (thinking) that Rabi is very bad.’ is a completely fine non-factive (i.e. a THINK-reading) attitude report which can introduce a new idea to the discourse. The reviewer also asked if the “always precedes” applies across worlds. We clarify that it does not. It can vary from world to world. We only mentioned that the “always precedes” holds in a ‘situation’. That situation is part of a possible world, not every possible world.

<sup>20</sup> Bondarenko (2020) also reported a similar phenomenon in Buryat (Mongolic), where a *gəžə*-clause, which denotes a property of contentful eventualities, cannot compose as the Theme of the attitude verb, *hanaxa*. Instead, it ends up modifying the eventuality argument of the matrix verb.

<sup>21</sup> If  $\alpha$  is a branching node and  $\{\beta, \gamma\}$  is the set of its daughters, then, for any situation  $s$  and any assignment  $g$ ,  $\alpha$  is in the domain of  $\llbracket \cdot \rrbracket^{sg}$  if  $\beta$  and  $\gamma$  are, and if  $\llbracket \beta \rrbracket^{sg}$  is a predicate  $P_\beta$  of type  $\langle \sigma, t \rangle$  and  $\gamma$  is a predicate  $P_\gamma$  of type  $\langle \sigma, t \rangle$ . In this case,  $\llbracket \alpha \rrbracket^{sg} = \lambda u: u \ D_e$  and  $u$  is in the domain of  $\llbracket \beta \rrbracket^{sg}$  and  $\llbracket \gamma \rrbracket^{sg}$ .  $P_\beta(u) = 1$  and  $P_\gamma(u) = 1$ .

<sup>22</sup> If  $\alpha$  is a branching node and  $\{\beta, \gamma\}$  is the set of its daughters, then, for any situation  $s$  and any assignment  $g$ ,  $\alpha$  is in the domain of  $\llbracket \cdot \rrbracket^{sg}$  if  $\beta$  and  $\gamma$  are, and if  $\llbracket \beta \rrbracket^{sg}$  is a predicate  $P_\beta$  of type  $\langle e, \langle e, \langle v, t \rangle \rangle \rangle$  and  $\gamma$  is a predicate  $P_\gamma$  of type  $\langle e, t \rangle$ . In this case,  $\llbracket \alpha \rrbracket^{sg} = \lambda y: y \ D_e$  and  $y$  is in the domain of  $\llbracket \beta \rrbracket^{sg}$ .  $\lambda x: x \ D_e$  and  $x$  is in the domain of  $\llbracket \beta \rrbracket^{sg}$  and  $\llbracket \gamma \rrbracket^{sg}$ .  $\lambda e: e \ D_v$  and  $e$  is in the domain of  $\llbracket \beta \rrbracket^{sg}$ .  $P_\beta(x)(y)(e) = 1$



and  $P\gamma(x) = 1$ .

<sup>23</sup> Cf. Szabolcsi & Zwarts (1993) also for the factive islandhood phenomenon, considering the following:

Szabolcsi & Zwarts (1993)

- (i) \**From whom do you regret [having gotten this letter \_\_\_\_\_]?*

Extracting the *wh*-phrase *from whom* out of the complement domain results in ungrammaticality.

<sup>24</sup> As per native judgments, the sentence (58) is grammatical only with the sense of *imagine* or *think*, but not with that of *recall*. Thus, adjunct extraction is possible only when a non-factive sense comes to the fore. Intriguingly, on the other hand, extraction out of a *bole*-clause is always allowed, yielding us only the reading of THINK, but never RECALL. See the following:

- (i) *Kothay<sub>i</sub> Rabi [Anu ar Mina ekshathe t<sub>i</sub> phirto bole]*  
*where Rabi Anu and Mina together return.HAB.PST.3 BOLE*  
*bhabchilo?*  
*think.PROG.PST.3*  
 ‘\*Where<sub>i</sub> was Rabi recalling [Anu and Mina used to return t<sub>i</sub> together]?’  
 ‘✓Where<sub>i</sub> was Rabi thinking [Anu and Mina used to return t<sub>i</sub> together]?’

<sup>25</sup> Cf. Jarrah (2017) for a similar observation in Jordanian Arabic.

<sup>26</sup> We talked about the D-linked *wh*-phrases because it was said in literature (Haegeman 2012) that feature-wise rich D-linked *wh*-phrases can be extracted in English (*Which man did my father regret/forget/forget/know stole the car?* (Jarrah 2017)). However, this is not the case with Bangla.

<sup>27</sup> Though we are using the term ‘modifier CP’, syntactically it is a complement to the silent noun, instead of an adjunct.

<sup>28</sup> As one of the reviewers inquired about the status of the silent nominal *fact*, we argue that it is a propositional entity. In other words, the Content of the entity is a proposition that is accessed by speakers and hearers in a conversation, and the proposition holds in the actual world/situation. Our analysis goes in line with Moulton’s (2009) analysis of locating modal operators with factivity in the embedded clauses, like below:

- (i) *John {saw / heard / felt} [FACT that it was snowing].*

Here, the modal operator FACT can be equated with our silent *fact*-entity that is to be interpreted in terms of the content modality (Kratzer 2013b). This silent *fact* is contentful (cf. (44)) and the Content of it is true in the actual reality. As mentioned in the main text, see also Bondarenko (2021) for the use of silent *fact*-nominal in a similar context.

<sup>29</sup> An anonymous reviewer asked whether the existence and familiarity inference in (72) is not contributed by the demonstrative. We agree that it is obviously encoded in the semantics of demonstratives. But, additionally, the existence and the familiarity conditions are also encoded in the ‘if ...’ part of the verbal semantics because the ‘if ...’ part is talking about the RECALL-reading, where the topic of remembering/recalling always pre-exists the matrix event of remembering it. Both existence and familiarity in discourse must be satisfied.

<sup>30</sup> Though Hanink & Bochnak (2017) called the *ge/gi* as a marker of definiteness in Washo nominalized complements, later Bochnak & Hanink (2021) revised their stand by calling it a marker of mere familiarity and postulated that familiarity is not enough for exporting factivity in Washo.

<sup>31</sup> A report  $P\phi$  is veridical if  $P\phi$  entails  $\phi$ . Verbs like *prove* are veridical because they entail the truth of their complements.

<sup>32</sup> In Section 4, we viewed gerundial forms as event kinds of type  $v$ . However, that would not create any problem for us to compose the  $\varepsilon$  head, which seeks a  $\langle v, t \rangle$ -type predicate, with a gerund. In this case, we need to change the kind-level interpretation into its corresponding property-level one by using Chierchia's (1998) predicativizing  $\cup$  operator.

<sup>33</sup> Modified Predicate Modification (adapted from Bondarenko (2019a)):

If  $\alpha$  is a branching node and  $\{\beta, \gamma\}$  is the set of its daughters, then, for any situation  $s$  and any assignment  $g$ ,  $\alpha$  is in the domain of  $\llbracket \cdot \rrbracket^{s,g}$  if  $\beta$  and  $\gamma$  are, and if  $\llbracket \beta \rrbracket^{s,g}$  is a predicate  $P\beta$  of type  $\langle \sigma_1, \langle \sigma_2, \dots, \langle \sigma_k, \dots \langle \sigma_n, t \rangle \rangle \rangle \rangle$  and  $\gamma$  is a predicate  $P\gamma$  of type  $\langle \sigma_i, t \rangle$ . In this case,  $\llbracket \alpha \rrbracket^{s,g} = \lambda x_1 \lambda x_2 \dots \lambda x_k \dots \lambda x_n: x_1 \dots x_n$  are in the domain of  $\llbracket \beta \rrbracket^{s,g}$  and  $x_k$  is also in the domain of  $\llbracket \gamma \rrbracket^{s,g}$ .  $P\beta(x_1)(x_2) \dots (x_k) \dots (x_n) = 1$  and  $P\gamma(x_k) = 1$ .

<sup>34</sup> As for the route of composition, it is all about the choice between the Object/Topic of the event and the Content of the event. The  $\varepsilon$  introduced the Content function into the scenario, making the gerund a set of eventualities associated with propositional content. This propositional content cannot be guaranteed to be true in actual reality. Since *hope* is non-factive in nature, its Content cannot be said to be true necessarily. This is the crux of Banerjee's (2023a) postulation, where the gerund is not treated as the Object/Theme/Topic of the hoping event, but rather it modifies the hoping event, giving us pure non-factive semantics. Thus, to clarify an anonymous reviewer, the  $\varepsilon$ -shifted gerund does not combine with *bhab-* as its Theme; instead, it modifies the matrix event.

<sup>35</sup> Imposing restrictions on arguments by verbs is not uncommon in literature. See the following contrast, where the verb of use, e.g. *read*, as opposed to the verb of creation, e.g. *write*, requires its Theme to exist beforehand:

(i) *John read a book.*  $\rightarrow$  *There existed a book before the event of reading.*

(ii) *John wrote an essay.*  $\nrightarrow$  *There existed an essay before the event of writing.*

As per Diesing (1992), these kinds of restrictions are grammatically encoded at the level of syntax. Thus, it seems no illogical to predict the presence of pre-existence restriction associated with the Theme of *mone por-*. See Bondarenko (2020) for a similar assumption about the internal argument of the Buryat verb *hanaxa*.

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