

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

Arka Banerjee

Faculty of English, The West Bengal National University of Juridical Sciences, India,  
<banerjeesoumyo29@gmail.com, arkabanerjee@nujs.edu>

This paper questions the idea which tells us that factivity is directly exported/solely derived from verbs. In support of this, it picks up a Bangla attitude verb, viz. *bhab-* 'think' which displays factivity alternation - it shows both factive REMEMBER/RECALL and non-factive THINK readings based on the type of the complement it combines with. It turns out to be factive with a gerundial DP, while it is not factive with finite clauses across the board. Bangla has two sorts of finite clauses in non-matrix positions which are as follows: the nominal-like *je*-clause and the adverbial-like *bole*-clause. With the former type, this attitude verb may have a RECALL reading depending on the context while with the second type, it is always THINK. We argue that RECALL reading comes to the fore when the Theme or internal argument of the attitude verb in concern always pre-exists the matrix event; otherwise, a THINK reading is available only. While hunting for the source of factivity of *bhab-* with gerundial complements, we argue that gerundial complements of *bhab-* always pre-exist the matrix event and compose with it as its Theme argument directly, yielding a factive interpretation. With adverbial *bole*-clauses, no factive inferences are derived because we argue that they only modify the eventuality argument of *bhab-*. On the other hand, a *je*-clause, we argue, composes with *bhab-* by restricting its object. Merely restricting the Theme does not tell us anything about getting factive inferences. But when factivity arises with a *je*-clause embedded under *bhab-*, we argue that the complement is a DP, not a CP, (i) whose nominal slot is occupied by a null *fact*-denoting entity that the *je*-CP modifies, and (ii) which always pre-exists the starting point of the matrix event. In this paper, we analyze the concerned transitive attitude verb adopting a Landman (1996, 2000)-style verbal denotation where both object and subject are mapped onto the set of events.

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

- (1) (Schulz 2003: 10)
- a. *Mary<sub>i</sub> forgot that she<sub>i</sub> 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 does not turn out to be factive with an infinitival clause. A compositional approach toward factivity also explains what is called FACTIVITY ALTERNATION (Moulton 2009; Abrusà 2011; Özyıldız 2017; Bondarenko 2019b, Lee 2019; Bonadrenko 2020). The term 'factivity alternation' refers to the phenomenon where an attitude verb exhibits both factive and non-factive readings based on the type of complement 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.<sup>1</sup> 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 stuff 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 if Anu and Mina used to do so.

a.	<i>Rabi</i>	<i>bhabchilo</i>	<i>je</i>	<i>Anu</i>	<i>ar</i>	<i>Mina</i>	<i>ekshathe</i>	<i>bari</i>
	Rabi	think. PROG.PST.3	that	Anu	and	Mina	together	house
	<i>phirto.</i> <sup>2</sup>							
	return. HAB.PST.3							

'Rabi was **thinking/imagining** that Anu and Mina used to return home together.'

b.	<i>Rabi</i>	<i>Anu</i>	<i>ar</i>	<i>Mina</i>	<i>ekshathe</i>	<i>bari</i>	<i>phirto</i>	<i>bole</i>
	Rabi	Anu	and	Mina	together	house	return. HAB.PST.3	BOLE
	<i>bhabchilo.</i>							
	think. PROG.PST.3							

'Rabi was **thinking/imagining** that Anu and Mina used to return home together.'

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

'#Rabi was **remembering/recalling** Anu and Mina's returns to their house together.'

In this situation, the speaker can utter either of the first and second sentences, but not the third one. In (2a-b) this verb is combined with finite clauses, while a gerund DP is a complement to it in (2c). In the above context, (2c) is infelicitous because it does not fit into the context where the speaker is not sure whether Anu and Mina used to return home together. (2c) should be contradictory given that we have assumed the speaker's ignorance. The infelicity, which is shown by the symbol '#', arises because (2c) can only have a factive usage, coming up with the sense of RECALL. Uttering (2c) is apt only in the context where Anu and Mina indeed returned home together regularly, and the speaker knows it. This kind of factive inference is due to the combination of a gerundial complement with *bhab-*, which we will address in a detailed way. Hence, it has been shown that *bhab-* does not behave uniformly in terms of invoking factivity while composing with all types of clauses.

Although (2a) instantiates a non-presupposed status of the embedded *je*-clause, the Bangla native informants confirmed that the verb *bhab-* can also exhibit factivity with a *je*-clause in a context like (3) where reminiscence of memories is in concern. But, it can never have a factive avatar with a *bole*-clause; it always surfaces with the sense of THINK while combining with a *bole*-clause. This is why (3b) turns out to be infelicitous in the following *recall* context, which is indicated by the '#' symbol.

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

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

'Rabi was **remembering/recalling** that Anu and Mina used to return home together.'

b.	<i>#Rabi</i>	<i>Anu</i>	<i>ar</i>	<i>Mina</i>	<i>ekshathe</i>	<i>bari</i>	<i>phirto</i>	<i>bole</i>
	Rabi	Anu	and	Mina	together	house	return. HAB.PST.3	BOLE
	<i>bhabchilo</i> .							
	think. PROG.PST.3							

'#Rabi was **thinking/imagining** that Anu and Mina used to return home together.'

c.	<i>Rabi</i>	<i>Anu</i>	<i>ar</i>	<i>Mina-r</i>	<i>ekshathe</i>	<i>bari</i>	<i>pher-a-gulo</i>
	Rabi	Anu	and	Mina- GEN	together	house	return-GER-CLF
	<i>bhabchilo</i> .						
	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 will address the complexity of factivity alternation associated with *bhab-* and explore the question of how this concerned verb alters factivity. We argue that the concerned attitude verb is not factive *per se*. It always comes up with a factive interpretation with a gerundial complement because we argue that a gerund is composed with the verb as its Theme and it always pre-exists the matrix event. However, a *bole*-clause only modifies the eventuality argument of the matrix event, not giving rise to any sort of factivity. In the case of a *je*-clause, we assert that it only restricts the Theme of the matrix event and hence no guaranteed factive inferences. But in cases like (3a) where a factive reading pops up with a *je*-CP, we argue that the complement is not a bare CP, but a DP whose nominal slot is occupied by a silent *fact* nominal which is modified by the *je*-clause. We also show that this DP always pre-exists the main clause event. Throughout this paper, we argue that an item of the DP category of type *e* or *v* is composed with the verb *bhab-* by saturating its internal or Theme argument, whereas a bare *je*-CP that is not inside a DP acts as a restrictive modifier of the verbal predicate and a *bole*-clause only modifies the matrix event.

This paper is arranged as follows: the next section provides empirical evidence of where factive reading is derived and where not. §3 dedicates itself to dealing with Bangla *je*-clause and *bole*-clause, their syntax-semantics, *etc.* A detailed discussion on Bangla gerunds and their interactions with classifiers lies in §4. In §5, we propose the semantics of the attitude verb *bhab-* and see how it

composes with a *bole*-clause, giving us no factive inferences. §6 sheds light on its combinations with *je*-clauses at the syntax-semantics interface. §7 offers the formal analysis accounting for the factive reading with a gerundial complement. Lastly, §8 summarizes the whole paper and an Appendix section lays out a comparison of *bhab*- with other Bangla attitude predicates similar to it.

## 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 stuff properly. He was saying he recalls that Anu and Mina used to get back home together from university. But, it was Sita, not Mina, who Anu used to return with.

a.	<i>Rabi</i>	<i>bhabchilo</i>	<i>je</i>	<i>Anu<sub>i</sub></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>o<sub>i</sub></i>	<i>Mina-r</i>	<i>shathe</i>	<i>noy,</i>
	house	return. HAB.PST.3	but	she	Mina-GEN	with	not
	<i>Sita-r</i>	<i>shathe</i>	<i>phirto.</i>				
	Sita-GEN	with	return. HAB.PST.3				

'Rabi was **thinking/Imagining** that Anu<sub>i</sub> and Mina used to return home together, but she<sub>i</sub> used to return with Sita, not Mina.'

b.	<i>Rabi</i>	<i>Anu<sub>i</sub></i>	<i>ar</i>	<i>Mina</i>	<i>ekshathe</i>	<i>bari</i>	<i>phirto</i>	<i>bole</i>
	Rabi	Anu	and	Mina	together	house	return. HAB.PST.3	BOLE
	<i>bhabchilo</i>	<i>kintu</i>	<i>o<sub>i</sub></i>	<i>Mina-r</i>	<i>shathe</i>	<i>noy,</i>	<i>Sita-r</i>	
	think. PROG.PST.3	but	she	Mina-GEN	with	not	Sita-GEN	
	<i>shathe</i>	<i>phirto.</i>						
	with	return. HAB.PST.3						

'Rabi was **thinking/Imagining** that Anu<sub>i</sub> and Mina used to return home together, but she<sub>i</sub> 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:	<i>Rabi</i>	<i>bhabchilo</i>	<i>je</i>	<i>Anu</i>	<i>ar</i>	<i>Mina</i>	<i>ekshathe</i>	<i>bari</i>
	Rabi	think. PROG.PST.3	that	Anu	and	Mina	together	house

	<i>phirto./</i>	<i>Rabi</i>	<i>Anu</i>	<i>ar</i>	<i>Mina</i>	<i>ekshathe</i>	<i>bari</i>
	return. HAB.PST.3/	Rabi	Anu	and	Mina	together	house
	<i>phirto</i>	<i>bole</i>	<i>bhabchilo.</i>				
	return. HAB.PST.3	BOLE	think. PROG.PST.3				

'Rabi was **thinking/imagining** that Anu and Mina used to return home together.'

H:	<i>#Ei!</i>	<i>ek</i>	<i>minute</i>	<i>dara,</i>	<i>ami</i>	<i>jantam</i>	<i>na</i>	<i>je</i>	<i>Anu</i>	<i>ar</i>
	Hey	one	minute	wait	I	know. HAB.PST.1	NEG	that	Anu	and
	<i>Mina</i>	<i>ekshathe</i>	<i>bari</i>	<i>phirto.</i>						
	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 get back home together is not presupposed, the speaker's ignorance about it does not make sense. The response of hearer (H) thus becomes 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)

<i>Rabi</i>	<i>Anu</i>	<i>ar</i>	<i>Mina-r</i>	<i>ekshathe</i>	<i>bari</i>	<i>pher-a-gulo</i>				
Rabi	Anu	and	Mina- GEN	together	house	return-GER-CLF				
<i>bhabchilo.</i>		<i>#kintu</i>	<i>ora</i>	<i>konodin</i>	<i>ekshathe</i>	<i>bari</i>	<i>phere</i>	<i>ni.</i>		
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 Anu and Mina's returns together. Now, the question will be - is it only entailment? or presupposition? Let us perform the HWAM test to check it.

(7)

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

'Rabi was **remembering/recalling** Anu and Mina's returns to their house together.'

H:	<i>Ei!</i>	<i>ek</i>	<i>minute</i>	<i>dara,</i>	<i>ami</i>	<i>jantam</i>	<i>na</i>	<i>je</i>	<i>Anu</i>	<i>ar</i>
	Hey	one	<i>minute</i>	wait	I	know. HAB.PST.1	NEG	that	Anu	and
	<i>Mina</i>	<i>ekshathe</i>	<i>bari</i>	<i>phirto.</i>						
	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 Anu and Mina's 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 and Hacquard (2014), Spector and 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).<sup>4</sup> 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 used to return home together regularly, which the speaker and Robi were already aware of. The speaker was having a chat with Rabi about the moments Anu and Mina spent together. Suddenly, Rabi stopped talking and told the speaker, "I am recalling something". But, he did not reveal what he was recalling. The speaker guessed 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.	Rabi	hoyto	Anu	ar	Mina-r	ekshathe	bari
	Rabi	possibly	Anu	and	Mina- GEN	together	house
	pher-a-gulo		bhabchilo.				
	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.

Thus, the verb *bhab-* does not behave uniformly with all types of clauses. With a *bole*-clause, it is always non-factive (2b), while it necessarily exports factivity with a gerundial complement as in (2c). Intriguingly, it behaves two-faced with *je*-clauses: with this type of embedded CPs, it can denote both THINK and RECALL senses in different contexts.<sup>5</sup> It is shown in (2a) and (3a), respectively. Therefore, we come up with the following pattern regarding the factivity alternation that this concerned verb shows:

<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 types/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 on Bangla *je*-clause and *bole*-clause

Bangla shows a hybrid complementizer system where it instantiates both clause-initial and clause-final complementizers (Singh 1980; Bayer 1996, 1999, 2001; Bayer *et al.* 2005). It has *je* as the clause-initial complementizer, while the clause-final counterpart is *bole*. According to Bayer (2001), final complementizers are all VERBAL DICENDI and are called QUOTATIVES (QUOT) because they set the previous discourse in quotes.<sup>6</sup> On the other hand, Bayer (2001) mentions that initial complementizers in Indo-European languages are mostly degenerate operators (OP). In languages like Bangla, Oriya, Hindi, *etc.* these are *ki* 'what', *je* (relativizer 'which'). Languages with Dravidian lineage only retain the clause-final complementizer<sup>7</sup>, while some of the Indo-Aryan languages (*e.g.* Bangla, Assamese) retain a mixed complementizer system. The quotative complementizer is formed by a verbal root, which corresponds to 'say', followed by participles like *-e/-i*, *etc.* On the other side, the clause-initial *je* or *ki* has an operator ancestor. But, *je* has lost its operator status and should be viewed as a C<sup>0</sup> element. Should it be an operator like a relative pronoun, it would be slotted in [Spec, CP] position, but this is not the case. Bayer (1996) discusses the following two examples from Bangla and Oriya, arguing for the non-operator status of *je*:

(10)

Bayer (1996: 258)								
a.	tumi	[ki	OSukhe] <sub>i</sub>	bhabcho	[je	e <sub>i</sub> 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 <sub>i</sub>	tume	bhaabucha	[je	e <sub>i</sub>	raamaku	saahaajya	kariba]?]
	<i>who</i>	<i>you</i>	<i>are-thinking</i>	<i>COMP</i>		<i>Ram</i>	<i>help</i>	<i>will-do</i>

Who do you think will help Ram? (from Bal 1990)

Bayer mentions that these two data point to the fact that it is impossible to license the intermediate traces of the extracted wh-phrases in the lower/embedded [Spec, CP] position, should *je* be an operator and occupy the specifier slot of the embedded CP. But, the above examples are grammatical. Therefore, *je* can be viewed as a complementizer, not anything else. Bayer (1996) also states that Bangla *je* can be historically related to a relativizing operator, but that does not guarantee its operator status. In support of it, he takes into account other languages like Germanic, Romance, Slavic, and modern Greek whose complementizers are related to various XP elements like deictic pronouns, and wh-operators that became reanalyzed as complementizer heads. The same process of reanalysis happened in cases of Bangla, Oriya, Assamese, etc.

Thus, following Bayer, we concluded that both *je* and *bole* are complementizers.<sup>8</sup> 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 get so.

(11)

Bayer <i>et al.</i> (2005: 95)								
a.	c <sup>h</sup> ele-ta	(e	ko <sup>t</sup> ha)	ʃune-c <sup>h</sup> e	[dʒe	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	bo <sup>l</sup> -e	c <sup>h</sup> ele-ta	(*e	ko <sup>t</sup> ha)	ʃune-c <sup>h</sup> e].
	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	ko <sup>t</sup> ha]	[je	baba	aʃ-be]	jan-e	na.
	<i>boy-CF</i>	<i>this</i>	<i>news</i>	<i>COMP</i>	<i>father</i>	<i>come-FUT3</i>	<i>know-3</i>	<i>not</i>

As mentioned in Bayer (1996), (12) turns out to be completely ungrammatical when the NP *e ko<sup>t</sup>ha* 'this news' is replaced by an empty pronoun.

(13) \*chele-Ta *pro* [je baba aʃ-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 was 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 the semantics of it, 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



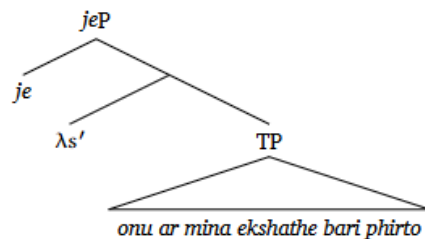
hypothesis, the complementizer introduces the Content function as defined below, given a situation  $s$  and an assignment function  $g$ :

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

It takes a proposition and returns the set of CONTENTFUL INDIVIDUALS (*ibid.*), such that their Content is identical to the proposition which 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**:  $\mathbf{Content}(y) = \{s \mid s \text{ is compatible with the intentional content determined by } y\}$ .

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 true 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  $\langle s,t \rangle$ .<sup>9</sup> It then combines with the complementizer by the rule of Intensional Function Application,<sup>10</sup> resulting in the following interpretation of the embedded *jeP*:

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

As per the above denotation, 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.<sup>11</sup> The Content function is introduced by the clause-initial *je* which is built on contentful individuals just like the complementizer *that* in English.<sup>12</sup> 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 and 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 VERBAL DICENDI. Not only in this language but there are several reports on the conversion of verbs of saying into quotative complementizers in various languages (Lord 1976; Crowley 1989; Klammer 2000, a.m.o.). 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.<sup>13</sup> Following Klammer (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 got 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 got 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 which is booked for direct evidence.<sup>14</sup> 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 and Nevins 2004; Sudo 2012, a.m.o.) because of the presence of the verb *say* in these complementizers, introducing the monstrous operator. But, this sort of indexical shift is not available with Bangla *bole*-clause. See the following where it seemed to native speakers that the first person pronoun may refer to the attitude holder:

(17)

<i>Rabi</i>	<i>ami</i>	<i>Mina-ke</i>	<i>bhalobash-i</i>	<i>bole</i>	<i>bol-lo.</i>
Rabi	I	Mina-ACC	love- PRS.1	BOLE	say-PST.3

'Rabi said that I<sub>Rabi/speaker</sub> 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)

<i>Rabi</i>	<i>[ami</i>	<i>kake</i>	<i>bhalobash-i</i>	<i>bole]</i>	<i>bol-lo?</i>
Rabi	I	who-ACC	love- PRS.1	BOLE	say-PST.3

'✓ Who<sub>i</sub> did Rabi say I<sub>speaker</sub> love t<sub>i</sub>?''

'✗ Who<sub>i</sub> did Rabi<sub>k</sub> say he<sub>k</sub> love t<sub>i</sub>?''

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 which is not so.<sup>15</sup>

(19)

<i>Rabi<sub>i</sub></i>	<i>[Mina</i>	<i>khun-ta</i>		<i>koreche</i>		<i>bole]</i>	<i>bhabchilo,</i>		<i>kintu</i>	
Rabi	Mina	murder-CLF		do.PRF.PRS.3		BOLE	think. PROG.PST.3		but	
<i>o<sub>i</sub></i>	<i>ba</i>	<i>keu</i>	<i>e</i>	<i>kotha</i>		<i>konodino</i>	<i>kauke</i>		<i>bol-e</i>	<i>ni.</i>
he	or	anyone	this	talk	ever	anyone.ACC	say-3		PRF.PST.NEG	

'Rabi<sub>i</sub> was thinking that Mina did the murder, but he<sub>i</sub> 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.

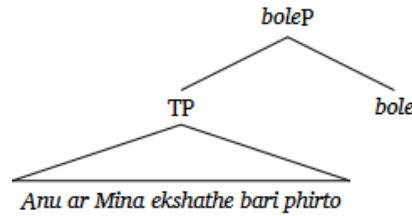
(20)

<i>Computer</i>	<i>tar</i>	<i>database-e</i>	<i>tomar</i>	<i>nam</i>	<i>nei</i>	<i>bole</i>	<i>dekhacche.</i>
computer	its	database-LOC	your	name	be.NEG	BOLE	show. PROG.PRS.3

'The computer is showing that your name is not there in its database.'

Thus, it is quite evident that the complementizer *bole* does not carry the semantics of *say* anymore.<sup>16</sup> 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  $v$ -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)  $\llbracket \text{bole} \rrbracket^{s,g} = \lambda p_{\langle s, t \rangle} \lambda e_v. \text{Content}(e) = p$

(23)  $\llbracket \text{boleP} \rrbracket^{s,g} = \llbracket \text{Anu ar Mina ekshathe bari phirto bole} \rrbracket^{s,g} = \lambda e_v. \text{Content}(e) = \lambda s'. \text{Anu and Mina used to return home together in } s'$

Relative to situation  $s$ , the *boleP* refers to the set of contentful eventualities of type  $v$  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  $\langle v, t \rangle$ -type *bole*-clause, which is a predicate of **eventualities** (of type  $v$ ), 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 and Bhattacharya 2003), while the latter shows only the wide scope readings of them (Kidwai 2014; Datta 2018; Balusu 2020; Banerjee 2023b).<sup>17</sup> Consider the following:

(24)

<i>Ora</i>	<i>shuneche</i>	<i>je</i>	<i>ke</i>	<i>ashbe.</i>
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)

<i>Ora</i>	<i>ke</i>	<i>ashbe</i>	<i>bole</i>	<i>shuneche</i>
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 *jeP*, 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 us think that *bole*-clauses are arguments instead of adjuncts.

(26)

<i>Kake<sub>i</sub></i>	<i>tumi</i>	<i>[Anu</i>	<i>pochondo</i>	<i>korbe</i>	<i>t<sub>i</sub></i>	<i>bole]</i>	<i>bhabcho?</i>
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 out of adjunct clauses are possible in some cases. Consider the following:

(27) *What<sub>k</sub> did Mina come in [whistling t<sub>k</sub>]? (Bondarenko forthcoming)*

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. We will see in §5 that a *bole*-clause depicts a single event with the main clause.

#### 4. Unwrapping Bangla gerunds

The complement gerund in (2c) is a bare gerund-classifier complex.<sup>18</sup> Here we use the term 'bare' to indicate that no classifiers are attached to the deverbalized/gerundial NPs. Before getting into the detailed semantics of the complex, we need to look at how the bare gerund can be treated. We follow Grim and McNally's (2015) insight in viewing verbal *-ing* forms as event kinds. Along this line, 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 and 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 to the gerunds because, following Dayal (2012), Bangla classifiers like *-ta* and *-gulo* ask for kind-level entities as their arguments. See also Bryant and 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 a situation *s* can be formulated as below:

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

Following Grim and McNally (2015), Chierchia's (1998)  $\cup$  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 a situation *s*, the concerned bare gerund in (28) denotes the property of event kinds *e<sub>k</sub>* such that *e<sub>k</sub>* is returning together in *s*, agents of *e<sub>k</sub>* are Anu and Mina, and the location of *e<sub>k</sub>* 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:

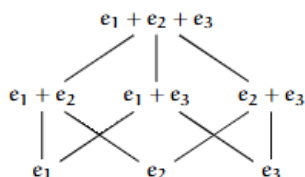
(30) Context: Rabi was recalling the incident of Anu and Mina's quitting the job together.

a.	<i>Rabi</i>	<i>[Anu</i>	<i>ar</i>	<i>Mina-r</i>	<i>ekshathe</i>	<i>chakri</i>	<i>chere</i>	<i>de-wa-ta]</i>
	Rabi	Anu	and	Mina-GEN	together	job	quit. PFV	give- GER- CLF
	<i>bhabchilo.</i>							
	think. PROG.PST.3							

'Rabi was recalling Anu and Mina's quitting the job together.'

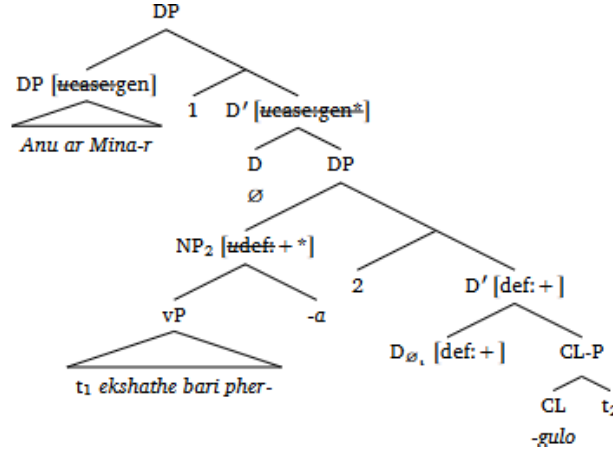
Here the particular event of their quitting the job together is being referred to, and Rabi remembers that. As opposed to *-gulo*, this classifier in concern points toward an atomic definite event. The classifier *-ta* when suffixed to nominals like *boi* 'book' also gives us a definite singular reading, *e.g.* *boi + -ta* → *boi-ta* 'the book'. See also Dayal (2012, 2014) for more details on this classifier.<sup>19</sup> 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  $e_n$  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 one *-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 which is realized by the genitive *-r* marker. While moving to its target position, it leaves a trace  $t_1$  and creates a binder 1 which 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.

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

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

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 ( $\lambda$ -abstraction), a function from  $D_v$  to  $D_v$  is yielded. Consider the interpretation in (38).

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

$$(36) \quad \llbracket D_{\emptyset_1} \rrbracket^{s,g} = \lambda P_{\langle v, t \rangle}. \iota e_v P(e)^{20}$$

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

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

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

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 in what follows:

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

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

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

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

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

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

Thus, (41) relative to a situation  $s$  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 clauses of different 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 *bole*P.

### 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).

$$(43) \quad \llbracket \text{bhab} \rrbracket^{s,g} = \lambda y \in D_e \cup D_v \lambda x \in D_e \lambda e \in D_v. \text{think}_s(e) \wedge \text{Exp}_s(e) = x \wedge \text{Th}_s(e) = y$$

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

Relative to a situation  $s$ , we assume that this Bangla attitude verb in concern 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 pre-exists the matrix event (Bondarenko 2019a,b) always in  $s$ , otherwise, it will additionally assert 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 utter 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.<sup>21</sup> 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 put forward the following formalization which stands for the fact that the Theme always pre-exists the matrix event in  $s$ :

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

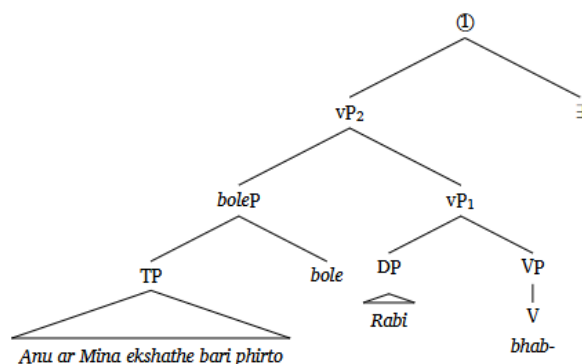
<i>Rabi</i>	<i>[<sub>NP</sub> oi</i>	<i>din-ta-r</i>	<i>kotha]</i>	<i>bhabchilo.</i>
Rabi	DEM.DIST	day-CLF-GEN	talk	think. PROG.PST.3

'Rabi was remembering that day'

The semantics proposed in (43) can successfully account for the above data. 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 argue 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 the following:

- (47)





Since the *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*-.<sup>22</sup> 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):

$$(48) \quad \llbracket VP \rrbracket^{s,g} = EC((43)) \\ \equiv \lambda x \in D_e \lambda e \in D_v. \exists y. \text{think}_s(e) \wedge \text{Exp}_s(e) = x \wedge \text{Th}_s(e) = y \\ \wedge \begin{cases} 1 & \text{if } LB(\tau(y)) <_{\text{always}} LB(\tau(e)) \text{ in } s \\ y \text{ is contentful in } s \wedge \forall s' \in DOX_{x,s}: \\ \quad \text{Content}_s(y)(s') = 1 & \text{otherwise} \end{cases}$$

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:

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

We argue that it is composed with the  $vP_1$  by Predicate Conjunction<sup>23</sup>, yielding the interpretation of  $vP_2$  as the following:

$$(49) \quad \llbracket vP_2 \rrbracket^{s,g} = \lambda e \in D_v. \exists y. \text{think}_s(e) \wedge \text{Exp}_s(e) = \text{Rabi} \wedge \text{Th}_s(e) = y \\ \wedge \begin{cases} 1 & \text{if } LB(\tau(y)) <_{\text{always}} LB(\tau(e)) \text{ in } s \\ y \text{ is contentful in } s \wedge \forall s' \in DOX_{\text{Rabi},s}: \\ \quad \text{Content}_s(y)(s') = 1 & \text{otherwise} \end{cases} \\ \wedge \text{Content}_s(e) = \lambda s'. \text{Anu and Mina used to return home together in } s'$$

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

$$(50) \quad \exists e \exists y. \text{think}_s(e) \wedge \text{Exp}_s(e) = \text{Rabi} \wedge \text{Th}_s(e) = y \\ \wedge \begin{cases} 1 & \text{if } LB(\tau(y)) <_{\text{always}} LB(\tau(e)) \text{ in } s \\ y \text{ is contentful in } s \wedge \forall s' \in DOX_{\text{Rabi},s}: \\ \quad \text{Content}_s(y)(s') = 1 & \text{otherwise} \end{cases} \\ \wedge \text{Content}_s(e) = \lambda s'. \text{Anu and Mina used to return home together in } s'$$

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; it might be false.

## 6. Composing with a *je*-clause

In §2, we mentioned that *bhab-* can give rise to either factive or non-factive interpretation while embedding *je*-clause, depending on the context in which the attitude report is uttered. Recall the context like (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). See below:

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

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 to 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 was 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-Ta	chele-ke <sub>i</sub>	bole-chi	[ <sub>CP</sub> je	Ek-jon	ta-ke <sub>i</sub>
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	[ <sub>CP</sub> je	ROBI	kolkata-Y	giye-chilo
I	only	think-PTS1	COMP	Ravi	Calcutta-LOC	go-PTS3

'I only thought that RAVI went to Calcutta.'

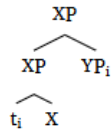
(53)

Bayer (1996)						
ami	Sudhu	bhebe-chi	[ <sub>CP</sub> 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 -- [<sub>XP</sub> X YP]. This is the crux of what Bayer (1996) called ARGUMENT SHIFT which converts an extraposed element into a complement. Following Bayer (1996), we assume that *je*-clause undergoes the argument shift, due to which it acquires the status of a complement that sits 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)

<i>Jodio</i>	<i>Rabi-ke</i>	<i>ba</i>	<i>kau-ke</i>	<i>e</i>	<i>kotha</i>	<i>age</i>	<i>keu</i>
though	Rabi-ACC	or	anyone-ACC	this	talk	before	anyone
<i>kokhono</i>	<i>bol-e</i>	<i>ni.</i>					
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 Bogal-Allbritten and 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 Restrict<sup>24</sup> (Chung and Ladusaw 2004), resulting in the following semantics of the VP relative to a situation *s*:

- (56)
- $$\begin{array}{c}
 \text{VP} \\
 \swarrow \quad \searrow \\
 \text{V} \quad \quad \text{CP} \\
 \text{bhab-} \\
 \text{je Anu ar Mina ekshathe bari phirto}
 \end{array}$$

$s, g$
- $= \lambda x \in D_e \lambda y \in D_e \lambda e \in D_v. \text{think}_s(e) \wedge \text{Exp}_s(e) = x \wedge \text{Th}_s(e) = y \wedge y \text{ is contentful in } s \wedge \forall s' \in \text{DOX}_{x,s}:$   
 $\text{Content}_s(y)(s') = 1 \wedge \text{Content}_s(y) = \lambda s''.$  Anu and Mina used to return home together in  $s''$   
 (via Restrict, (43) & (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 and Ladusaw 2004). Thus, the external argument slot precedes to get saturated, and once it gets  $\beta$ -converted by FA, two consecutive ECs (or the polyvalent existential closure) happen to yield the following interpretation of the whole sentence (cf. Chung and Ladusaw (2004) also for the application of polyvalent EC):

- (57)  $\exists y \exists e. \text{think}_s(e) \wedge \text{Exp}_s(e) = \text{Rabi} \wedge \text{Th}_s(e) = y \wedge y \text{ is contentful in } s \wedge \forall s' \in \text{DOX}_{\text{Rabi},s}: \text{Content}_s(y)(s') = 1 \wedge \text{Content}_s(y) = \lambda s''.$  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-* indeed 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.<sup>25</sup> See the following sentence which 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.<sup>26</sup>

- (58)
- |                           |                  |                   |             |            |           |             |                 |
|---------------------------|------------------|-------------------|-------------|------------|-----------|-------------|-----------------|
| <i>Kothay<sub>i</sub></i> | <i>Rabi</i>      | <i>bhabchilo</i>  | [ <i>je</i> | <i>Anu</i> | <i>ar</i> | <i>Mina</i> | <i>ekshathe</i> |
| where                     | Rabi             | think. PROG.PST.3 | that        | Anu        | and       | Mina        | together        |
| <i>t<sub>i</sub></i>      | <i>phirto</i> ?  |                   |             |            |           |             |                 |
|                           | return-HAB.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]?'

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, a.m.o.). 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.<sup>27</sup> See the following where a D(iscourse)-linked *wh*-word (*i.e.*, rich in its featural content) is involved:<sup>28</sup>

(59)

<i>Kon jayga-e</i>	<i>Rabi</i>	<i>bhabchilo</i>	<i>[je</i>	<i>Anu</i>	<i>ar</i>	<i>Mina</i>	<i>ekshathe</i>
which place-LOC	Rabi	think. PROG.PST.3	that	Anu	and	Mina	together
<i>t<sub>i</sub></i>	<i>phirto]</i> ?						
	return-HAB.PST.3						

'\*Which place<sub>i</sub> was Rabi **recalling** [Anu and Mina used to return *t<sub>i</sub>* together]?'

'✓Which place<sub>i</sub> was Rabi **thinking** [Anu and Mina used to return *t<sub>i</sub>* 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 (cf. 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 mentioned in Jarrah (2017)):

(60) (Grimshaw 1990)

\**John regrets that this book Mary read.*

(61)

(Maki <i>et al.</i> 1999)						
John-wa	[kono	hon-*wa/o	Mary-ga	yonda	no]-o	kookaisiteiru.
John-TOP	this	book-TOP/ACC	Mary- NOM	read	COMP-ACC	regret

'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:

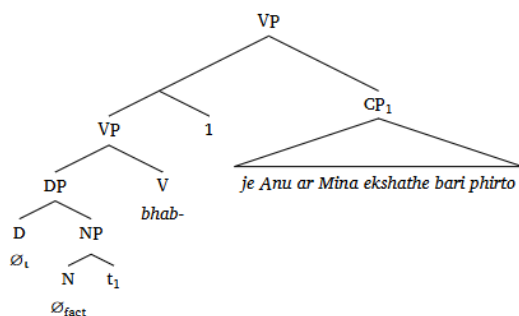
(62) Context: Rabi was recalling that Anu bought the car that her father was telling him about.

a.	<i>Rabi</i>	<i>bhabchilo</i>	<i>[je</i>	<i>gari-ta</i>	<i>Anu</i>	<i>kinechilo.</i>
	Rabi	think. PROG.PST.3	that	car- CLF	Anu	buy. PRF.PST.3

Lit: 'Rabi was recalling that the car, Anu had bought.'

This kind of embedded topicalization provides support against postulating a clause-typing operator in the left periphery of the factive complement in Bangla. Thus, an operator-based approach fails to account for the grammaticality in the above data. Instead, if we adopt the notion that the complement here is not a CP, but rather a DP with a null definite D and a silent noun that is modified by this CP (cf. Kiparsky & Kiparsky, 1970; Elbourne, 2013; Jarrah, 2017), the well-formedness of (62a) can nicely be taken care of because nothing prevents the object argument from getting topicalized in the modifier CP.<sup>29</sup> 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 *je*P complement (*i.e.*, a *je*-clause complement which is not modified by any overt nominal). See Bondarenko (forthcoming) 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 the above structure, the CP moves from its base-generated position, *i.e.*, the complement to N, and gets extraposed to the VP leaving a trace  $t_1$  and creating a  $\lambda$ -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 also 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  $V_{\text{att}}$  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*  $V_{\text{att}}$  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	<b>eta</b>	<i>bhabchilo</i>	<i>je</i>	Anu	ar	Mina	<i>ekshathe</i>
	Rabi	it	think. PROG.PST.3	that	Anu	and	Mina	together
	<i>bari</i>		<i>phirto.</i>					

	house	return. HAB.PST.3
--	-------	-------------------

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

a.	<i>Rabi-r</i>	<i>eta</i>	<i>mon-e</i>	<i>hoy</i>	<i>je</i>	<i>Anu</i>	<i>ar</i>	<i>Mina</i>	<i>ekshathe</i>
	Rabi-GEN	it	mind-LOC	happen.PRS.3	that	Anu	and	Mina	together
	<i>bari</i>	<i>phirto.</i>							
	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 the following:

$$(66) \quad \llbracket D_{\emptyset_1} \rrbracket^{s,g} = \lambda P_{\langle e,t \rangle} . \iota x_e P(x)$$

$$(67) \quad \llbracket \emptyset_{\text{fact}} \rrbracket^{s,g} = \lambda y_e . \text{facts}_s(y)^{30}$$

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:

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

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

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 which 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 has also 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)

<i>Kintu</i>	<i>Anu</i>	<i>Ar</i>	<i>Mina-r</i>	<i>ekshathe</i>	<i>bari</i>	<i>pher-a-r</i>	<i>kono</i>
but	Anu	and	Mina-GEN	together	home	return- GER-GEN	any
<i>ghotona</i>	<i>age</i>	<i>kokhono</i>	<i>ghot-e</i>	<i>ni.</i>			
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 a situation  $s$  and a variable assigner  $g$ :

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

given,  $LB(\tau(y.fact_s(y) \wedge \mathbf{Content}_s(y) = \lambda s'. \text{Anu and Mina used to return home together in } s')) <_{\text{always}} LB(\tau(e))$

In the above formulation, 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 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.	<i>Rabi</i>	<i>oi</i>	<i>gujob-ta</i>	<i>bhabchilo</i>	<i>je</i>	<i>Anu</i>	<i>ar</i>	<i>Mina</i>
	Rabi	DEM.DIST	rumor-CLF	think. PROG.PST.3	that	Anu	and	Mina
	<i>ekshathe</i>	<i>bari</i>	<i>phirto.</i>					
	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 does come up with a RECALL reading where a rumor indeed exists before the event of thinking of it.<sup>31</sup> 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 an existent one already in the CG. However, the Content of it does not hold true in the actual situation. We see that 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 generates while *bhab-* embeds a gerundial complement. We will show that in that case also the pre-existence requirement associated with its Theme will be retained.

## 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 go along. See the following example in (73) where the



contradictory *but*-conjunct is compatible with the preceding clause. Hence, no factive inference is drawn.

(73)

<i>Rabi</i>	<i>[Anu-r</i>	<i>vote-e</i>	<i>jet-a]</i>	<i>asha</i>	<i>korechilo,</i>	<i>✓kintu</i>
Rabi	Anu-GEN	vote-LOC	win-GER	hope	do.PRF.PST.3	but
<i>durbhagyoboshoto</i>	<i>Anu</i>	<i>konodino</i>	<i>vote-e</i>	<i>jet-e</i>	<i>ni.</i>	
unfortunately	Anu	ever	vote-LOC	win-3	PRF.PST.NEG	

'Rabi hoped for Anu to win elections, but unfortunately, she did not ever win 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 fraudulence:

(74)

<i>Amra</i>	<i>[Anu-r</i>	<i>shei</i>	<i>jet-a-gulo-i]</i>	<i>asha</i>	<i>korechilam</i>
we	Anu-GEN	DEM.DIST	win-GER-CLF-FOC	hope	do.PRF.PST.1
<i>je-gulo-te</i>	<i>kono</i>	<i>jocchuri</i>	<i>nei.</i>		
REL-CLF-LOC	any	fraudulence	be.NEG		

'We hoped for those winning events of Anu where there are no cases of fraudulence.'

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

(75)

<i>Kintu</i>	<i>o</i>	<i>ekbaro</i>	<i>shotbhabe</i>	<i>jet-e</i>	<i>ni.</i>
but	she	not-even-once	honestly	win-3	PRF.PST.NEG

'But, not even once she won honestly.'

We will 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 also, you saw the unique group of them on your way to school [uniqueness]. You reported this to me. → Definiteness

a.	<i>Ami</i>	<i>shei</i>	<i>lok-gulo-ke</i>	<i>dekh-lam.</i>
	I	DEM.DIST	people-CLF-ACC	see-PST.1

'I saw those people.'

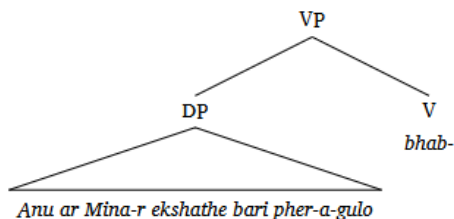
b.	<i>#Ami</i>	<i>kichu</i>	<i>lok-ke</i>	<i>dekh-lam.</i>
	I	some	people-ACC	see-PST.1

'#I saw some people.'

Despite having a definite gerund as the complement, *asha kor-* in (74) does not come up with any sort of factive inference. It challenges the view of Kastner (2015), Hanink and Bochnak (2017) who correlated factivity with definiteness.<sup>32</sup> 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 in to see how the factive reading gets surfaced in the example as 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)



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

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>33</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)

<i>Rabi</i>	<i>[Anu</i>	<i>ar</i>	<i>Mina-r</i>	<i>ekshathe</i>	<i>bari</i>	<i>pher-a-gulo]</i>	
Rabi	Anu	and	Mina- GEN	together	house	return-GER-CLF	
<i>bhabchilo</i>		<i>na,</i>	<i>bhabchilo</i>		<i>onyo</i>	<i>kichu.</i>	
think. PROG.PST.3		NEG	think. PROG.PST.3		else	something	
<i>#ashole</i>	<i>Anu</i>	<i>Ar</i>	<i>Mina-r</i>	<i>ekshathe</i>	<i>bari</i>	<i>pher-a-r</i>	<i>kono</i>
in fact	Anu	and	Mina-GEN	together	home	return- GER-GEN	any
<i>ghotona</i>		<i>age</i>	<i>kokhono</i>		<i>ghot-e</i>	<i>ni.</i>	

event/fact	before	ever	happen-3	PRF.PST.NEG
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'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.'

At this point, one might ask what is then going on in the cases of (73,74). Does not the Theme combine with the verb as its Theme in these cases? Following Banerjee (2023a), our answer will be no. Banerjee (2023a) argued that if it is composed with the verb as its Theme/internal argument we would get a veridical attitude report, but this is not the case in reality - 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 any fraudulence. 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:

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

This head is purely a Content-introducing one that takes a gerundial DP which is a property of  $v$ -type events 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>34</sup> Let's take the case in (73). After the  $\epsilon$  head merges with the gerund DP by FA, we get the following:

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

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>35</sup> (MPM) (cf. Bondarenko 2019a).<sup>36</sup> See below:

$$(82) \quad \llbracket asha \text{ kor-} \rrbracket^{s,g} = \lambda y \in D_e \lambda x \in D_e \lambda e \in D_v. hope_s(e) \wedge Exp_s(e) = x \wedge Th_s(e) = y$$

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

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  $t$ :

$$(84) \quad \exists y \exists e. hope_s(e) \wedge Exp_s(e) = Rabi \wedge Th_s(e) = y \wedge \mathbf{Content}_s(e) = \lambda s'. \exists e'. e' \text{ is an event of Anu winning elections in } s'$$

It is important to note that the propositional argument becomes the Content of the 'hope' event, thus it can get false in the actual situation because the Content of an eventuality might not get true in reality. This is how we get no sign of factivity with *hope* taking a gerundial DP in Bangla. 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. Following Banerjee's (2023a) insight, the

idea of introducing the eventive projection over the gerund DP in examples like (73) is a bit stipulative. But this stipulation, we argue, is correct because it can logically capture the lack of factivity.

## 8. Conclusion

To sum up, this paper has dealt with the Bangla verb *bhab-* 'think' and its factivity alternations with different types of complements. This verb is factive with gerunds as complements, but not so with a clause with the final complementizer *bole* that is a verbal dicendi. Again, embedding a clause with the initial complementizer *je*, the verb can give us both factive and non-factive senses based on whether the complement always exists before the matrix event. Thus, factivity in our paper cannot be seen as a rigid property associated with predicates. In our case, the attitude verb *bhab-* can be seen as OPTIONALLY FACTIVE (Degen & Tonhauser forthcoming) that projects the content of its complement occasionally. Our study also raises objections to the concept of building any natural class of factive predicates. See also Degen & Tonhauser (forthcoming) who claim that 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.

In this paper, we have analyzed gerunds and the roles of classifiers on them, discussed the hybrid system of Bangla complementizers, and analyzed two types of finite clauses with two different complementizers at the syntax-semantics interface. Regarding the issue of the emergence of factivity, we argue in favor of a theory that relies on distinct compositional paths based on clause types that the predicate is composed with (see Özyıldız (2017) for Turkish, Bondarenko (2020) for Buryat). Mention of different meanings due to different complements is already prevalent in literature. Bogal-Allbritten (2016) showed in her dissertation that a Navajo *nisin*-sentence gets its meaning depending on the meaning of the embedded clause. Navajo *nisin* has a very generic attitude meaning which can get meanings 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 and 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 (F)functional (A)application, 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.

Though we are mostly in line with the claims made for Turkish and Buryat, Bangla exhibits some sort of divergence from them. In these two languages, composition with finite CPs is shown to have

yielded non-factivity with the verbs that show factivity alternation. However, the situation is not that simple in Bangla. 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 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 and Kiparsky 1970) standpoint where factive inferences can be extracted from complements.

Thus, in a nutshell, we embrace a hybrid standpoint regarding the emergence of factivity - we contend that while Bangla speaks in favor of embracing a compositional mechanism on the issue of factivity emergence to a greater extent, it also allows factivity to be exported from the complements as well in some cases. As future work, we can study factivity-altering verbs in other languages too, maybe from the same language family or other language families, and examine how they interact with different types of complementation. Cross-linguistically, we hope that this will undoubtedly open up a rich typological space that will help us grow an understanding of the theory of factivity as a whole.

## 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)

<i>*Rabi-r</i>	<i>[Anu-r</i>	<i>vote-e</i>	<i>jet-a]</i>	<i>mone</i>	<i>hoy.</i>
Rabi- GEN	Anu-GEN	vote-LOC	win-GER	mind.LOC	happen.PRS.3

'\*Rabi thinks Anu's winning the election.'

(86)

<i>Rabi-r</i>	<i>mone</i>	<i>hoy</i>	<i>je</i>	<i>Anu</i>	<i>vote-e</i>	<i>jitbe.</i>
Rabi- GEN	mind.LOC	happen.PRS.3	that	Anu	vote- LOC	win.FUT.3

'Rabi thinks that Anu will win the election.'

(87)

<i>Rabi-r</i>	<i>[maa-ke/</i>	<i>maa-er</i>	<i>kotha]</i>	<i>mone</i>	<i>hoy.</i>
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 too. 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. Though 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 which is not propositional in nature. Thus, we define the following semantics of it:

$$(88) \quad \llbracket mone\ ho- \rrbracket^{s,g} = \lambda y \in D_e \lambda x \in D_e \lambda e \in D_v: \underline{y \text{ is contentful}}. \text{think}_s(e) \wedge \text{Exp}_s(e) = x \wedge \text{Th}_s(e) = y$$

It says that *mone ho-* is defined if the internal argument or 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)

<i>Rabi-r</i>	<i>[Anu-r</i>	<i>vote-e</i>	<i>jet-a]</i>	<i>mone</i>	<i>pore.</i>
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)

<i>Rabi-r</i>	<i>mone</i>	<i>pore</i>	<i>je</i>	<i>Anu</i>	<i>vote-e</i>	<i>jitechilo.</i>
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)

<i>Rabi-r</i>	<i>[maa-ke/</i>	<i>maa-er</i>	<i>kotha]</i>	<i>mone</i>	<i>pore.</i>
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 and Karmakar 2020; Banerjee 2023a). Supporting data is the following:

(92)

<i>Amar</i>	<i>[maa-ke</i>	<i>mone</i>	<i>pore,</i>	<i>#kintu</i>	<i>maa</i>	<i>age</i>
I- GEN	mother- ACC	mind. LOC	fall. PRS. 3	but	mother	before
<i>konodino</i>	<i>kothao</i>	<i>chilo</i>	<i>na.</i>			
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-* relative to a situation *s* and an assignment function *g*:

$$(93) \quad \llbracket mone\ por- \rrbracket^{s,g} = \lambda y \in D_e \cup D_v \lambda x \in D_e \lambda e \in D_v: \underline{LB(\tau(y))} < \underline{LB(\tau(e))}.remember_s(e) \wedge Exp_s(e) = x \wedge Th_s(e) = y$$

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>37</sup> This is the reason why this verb, while embedding a gerund and nominal-like *je*-clause, never comes up with a sense of THINK and always gives us a RECALL reading unambiguously. Since the pre-existence requirement associated with its Theme is encoded in its semantics, there remains a fair amount of chance to have factivity with Bangla *mone por-* when it selects something as its complement.

On the other hand, *mone ho-* does not ever require its Theme to exist beforehand, thus it always comes up with a default THINK reading in an unambiguous way. Hence, no factivity arises with it. Rather, unlike *bhab-*, it always requires its Theme to be associated with some propositional content.

#### Acknowledgments

The judgments about all the Bangla data presented here are verified by 35-40 native speakers, both linguists and non-linguists, residing in Kolkata. We convey our thanks to each of them for their help. Thanks to Bidisha Bhattacharjee, Diti Bhadra, Marwan Jarrah, Samir Karmakar, Sujata Ghosh, Srabasti Dey, Tatiana Bondarenko, and Utpal Lahiri for their valuable insights on various issues from time to time. We also convey our thanks to all the members of the South Asian Semantics reading group and the anonymous reviewers of IJL for the very insightful comments. All errors are ours.

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## Notes

<sup>1</sup> Bangla, which is also known as Bengali, is an Eastern Indo-Aryan language largely 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. Concerning the data and glossings taken from other sources, we kept them as they were originally.

<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 suggesting me to stress on this point. 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> In this paper, we argue that both the readings involve different complement sizes, as glimpsed in the previous end-note. See §6 for more details on it.

<sup>6</sup> This clause-final complementizer is termed as quotative because it can host direct quotes. See the example below:

(i)	<i>Rabi</i>	<i>"ami</i>	<i>more</i>	<i>jacchi"</i>	<i>bole</i>	<i>chitkar</i>	<i>korlo.</i>
	Rabi	I	die	go.PROG.PRS.1	BOLE	scream	do.PST.3

'Rabi screamed, "I am dying".'

<sup>7</sup> See Balusu (2020) to get an idea of the polyfunctional nature of Dravidian quotative complementizer.

<sup>8</sup> See Kidwai (2014) for another approach that does not view *bole* as complementizer.

<sup>9</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>10</sup> After the situation-abstraction step, the intensional interpretation of the TP will be the following:

(i)  $[[TP]]_c^g = \lambda s'. \text{Anu and Mina used to return home together in } s'.$

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>11</sup> A same kind of predicate-like denotation is reported in the case of Laz *na*-clauses (cf. Demirok *et al.* 2019).

<sup>12</sup> As mentioned in Moulton (2018), Patrick Elliot (UCL, Handout) suggests that C cannot be the content function. This function is located higher to 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 like 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 *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)	<i>Rahul</i>	<i>dabi</i>	<i>korechilo</i>	<i>je</i>	<i>Robi</i>	<i>ekjon</i>	<i>thog</i>	<i>ebong</i>	<i>(*je)</i>	<i>Anu</i>	<i>shontanshombhoba.</i>
	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>13</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>14</sup> Thanks to one of the anonymous reviewers for suggesting to check if there can 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 the 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 Infomred 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 have informed him.

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

As reported by the native speakers, in these 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 Infomred 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.'

(iv)	Kintu,	amar	e-te	shondeho	ache.
	but	I.GEN	this-LOC	doubt	have

'But, I have doubts in 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 got 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>15</sup> See Bossi (2023) for a similar test in Kipsigis.

<sup>16</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. 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>17</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>18</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 factive necessarily; 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>19</sup> One of the reviewers mentioned the following data and asked how the classifier, in this case, can take care of atoms:

(i)	<i>Ram-er</i>	<i>[Sita</i>	<i>aar</i>	<i>Laxman-er</i>	<i>baar baar/</i>	<i>roj roj</i>	<i>ekshathe</i>	<i>phera]</i>	<i>-ta</i>
	Ram-gen	Sita	and	L.-gen	frequently	everyday	together	return-ger-TA	
	<i>mone</i>	<i>pore.</i>							
	mind	fall							

'Ram recalls Sita and Laxman returning together frequently/everyday.'

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 eksathe 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>20</sup> We are following von Stechow and Heim (2011) in viewing determiners world/situation-independent.

<sup>21</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, which 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>22</sup> Bondarenko (2020) also reported a similar phenomenon in Buryat (Mongolic) where a *gəʒə*-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>23</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  $\llbracket \cdot \rrbracket^{s,g}$  if  $\beta$  and  $\gamma$  are, and if  $\llbracket \beta \rrbracket^{s,g}$  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,  $\llbracket \alpha \rrbracket^{s,g} = \lambda u: u \in D_\sigma$  and  $u$  is in the domain of  $\llbracket \beta \rrbracket^{s,g}$  and  $\llbracket \gamma \rrbracket^{s,g}$ .  $P\beta(u) = 1 \ \& \ P\gamma(u) = 1$ .

<sup>24</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  $\llbracket \cdot \rrbracket^{s,g}$  if  $\beta$  and  $\gamma$  are, and if  $\llbracket \beta \rrbracket^{s,g}$  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,  $\llbracket \alpha \rrbracket^{s,g} = \lambda y: y \in D_e$  and  $y$  is in the domain of  $\llbracket \beta \rrbracket^{s,g}$ .  $\lambda x: x \in D_e$  and  $x$  is in the domain of  $\llbracket \beta \rrbracket^{s,g}$  and  $\llbracket \gamma \rrbracket^{s,g}$ .  $\lambda e: e \in D_v$  and  $e$  is in the domain of  $\llbracket \beta \rrbracket^{s,g}$ .  $P\beta(x)(y)(e) = 1 \ \& \ P\gamma(x) = 1$ .

<sup>25</sup> Cf. Szabolcsi and Zwarts (1993) also for the factive islandhood phenomenon, considering the following:

Szabolcsi and 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>26</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)	<i>Kothay<sub>i</sub></i>	<i>Rabi</i>	<i>[Anu</i>	<i>ar</i>	<i>Mina</i>	<i>ekshathe</i>	<i>t<sub>i</sub></i>	<i>phirto</i>	<i>bole]</i>
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	where	Rabi	Anu	and	Mina	together		return-HAB.PST.3	BOLE
	<i>bhabchilo?</i>								
	think. PROG.PST.3								

'\*Where<sub>i</sub> was Rabi **recalling** [Anu and Mina used to return <sub>t<sub>i</sub></sub> together]?'

'✓Where<sub>i</sub> was Rabi **thinking** [Anu and Mina used to return <sub>t<sub>i</sub></sub> together]?'

<sup>27</sup> Cf. Jarrah (2017) for a similar observation in Jordanian Arabic.

<sup>28</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 moved out of in English (*Which man did my father regret/forget/know stole the car?* (Jarrah 2017)). However, this is not the case with Bangla.

<sup>29</sup> Though we are using the term 'modifier CP', syntactically it is a complement to the silent noun, instead of an adjunct.

<sup>30</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 true 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 (forthcoming) for the use of silent *fact*-nominal in a similar context.

<sup>31</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 demonstrative. 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 of the matrix event of remembering it. Both existence and familiarity in discourse must be satisfied.

<sup>32</sup> Though Hanink and Bochnak (2017) called the *ge/gi* as a marker of definiteness in Washo nominalized complements, later Bochnak and 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>33</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>34</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>35</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  $\llbracket \llbracket \alpha \rrbracket^{s,g}$  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  $\langle \sigma_k, t \rangle$ . 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  $\llbracket \gamma \rrbracket^{s,g}$ .  $P\beta(x_1)(x_2) \dots (x_k) \dots (x_n) = 1$  &  $P\gamma(x_k) = 1$ .

<sup>36</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, 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>37</sup> Imposing restrictions over 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.* → *There existed a book before the event of reading.*

(ii) *John wrote an essay.* ⇏ *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*.