What gerund complements tell us about deontic necessity modals[1]

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Abstract. This work is an exploration of the interaction between deontic necessity modals and the obligatorily gerundive complements they take in South Asian languages, with a focus on Bangla. We investigate a novel semantic category of gerunds – which we call *gen-gerunds* – arguing that they contain special morphology that embodies a relation between a deontic necessity and a set of eventualities that this necessity holds over. This morphology turns gen-gerunds into definite descriptions, unlike regular gerunds. Focusing futher on the (in)compatibilities between regular and gen-gerunds and strong and weak deontic necessity, we argue that the composition is affected by the nominal or predicative status of the modals, and these effects directly inform the distribution of these elements. We connect our account to interaction with negation and copulas with strong and weak necessity as well, and argue that the combined factors of the semantics of gerunds and the categorial semantics of the modals themselves provide the answers to our main questions.

Keywords: gerunds, gen-gerunds, deontic modals, strong necessity, weak necessity, events, Bangla, morphosemantics

1. Introduction

Deontic modality, which is traditionally defined in terms of permission and obligation (Kratzer 1981, Palmer 2001, Nuyts 2006) is expressed through a variety of constructions across languages. In the vast body of work on deontic necessity and gradations of modal force leading to strong and weak deontic necessity modals (Sloman 1970, Frank 1996, von Fintel and Iatridou 2008, Rubinstein 2012, 2014, Lassiter 2011, 2017, Silk 2018), one of the main points of focus has been on the form of the modals themselves. For example, von Fintel and Iatridou (2008) showed that unlike English, which has separate lexical items for strong and weak deontic necessity (*have to, must, need to* vs. *ought, should*, for example), many Romance, Germanic, Slavic, Uralic languages use counterfactual morphology to compositionally derive weakness from strength within necessity. Rubinstein (2014) demonstrates that Hebrew, instead of such a compositional route, uses comparative evaluative such as 'better' to produce weak necessity claims.

Against this backdrop of investigations into the diversity of modal forms, this paper seeks to add to the discussion a study of the *complements* of weak and strong deontic necessity modal predicates. Taking Bangla (also known as Bengali; Indo-Aryan) as our representative language, we track the distinctions between strong and weak necessity deontic modals with respect to the only complements they can take – gerunds – in addition to the forms of the modals themselves. This exploration also allows us to form a better picture of an areal semantic feature of many South Asian languages: modal predicates often seem to prefer only non-finite complements. We present a compositional account of Bangla deontic necessity modals and their complements couched in event semantics, adopting the view that gerunds are sets of eventu-

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alities (Portner, 1991). In pursuing this analysis, we explore a new kind of semantic gerund – *gen-gerunds* – which are gerund complements of modals marked with what looks like genitive case morphology, and we account for the gen-gerund-modal interactions with the same formal tools.

In previous work on South Asian languages such as Hindi-Urdu, Bhatt et al. (2011) report that there are very few dedicated modal verbs; instead, specific constructions involving a combination of a certain verb with a certain type of embedded verb as the complement (and certain case on the subject) result in modal meanings (see also Butt 1995, Davison 2014). With regards to deontic modality, the embedded verb complement is always infinitival in Hindi-Urdu, as exemplified below (Bhatt et al. 2011: (2a)).

(1) Yasin=ko ye kar-na chahiye
Yasin.M.SG.=DAT this.SG.NOM do-INF.M.SG need.SG
'Yasin needs to do this.'

The modal reading is only possible when the construction has an infinitive. This ban on the finite form as a complement of a modal predicate appears to be a significant feature of the greater linguistic area. In Bangla, deontic necessity obligatorily requires a gerundive construction as the embedded form:[2]

(2) Anu-r ja-wa **dorkar**.
Anu-GEN go-GER need
'Anu needs to go.'

(3) Anu-r ja-wa **uchit**.
Anu-GEN go-GER should
'Anu should go.'

None of the other forms of the embedded verb, whether progressive or perfective or infinitival, are allowed with the modal predicates *dorkar* and *uchit*.

(4) Anu-r
Anu-GEN
*je-te/*ja-cche/*ja-cchilo/*ge-che/*ge-chilo
*go-INF./*go-PRS.PROG.3P/*go-PST.PROG.3P/*go-PRS.PERF.3P/*go-PST.PERF.3P
dorkar/uchit
need/should
Lit. Intended: 'Anu to go/is going/was going/has gone/had gone need/should.'

Neither of the modal predicates *dorkar* or *uchit* behave like ordinary verbs in Bangla (unlike their Hindi-Urdu counterparts). Furthermore, as is evident from the glosses, there is a crucial distinction between the two predicates: *dorkar* is a strong necessity modal (English examples of which are *has to, got to, must, need*), while *uchit* is a weak necessity modal (English examples of which are *should, ought to*).

[2] *Uchit* can have an epistemic use as well (similar to English *should* in the epistemic/deontic ambiguity) which we can ignore for our purposes here.

Interestingly, while both *dorkar* and *uchit* require gerundive complements[3], they differ in another fundamental way. Consider the contrast below:

(5) a. Anu-r ja-wa-**r** **dorkar**.
Anu-GER go-GEN-GER need
'The need of Anu's going exists.'
b. *Anu-r ja-wa-**r** **uchit**.
Anu-GER go-GEN-GER should
'Anu should go.'

We argue that this additional morphology (identical in form to the genitive case) on a Bangla gerund creates a second type of *semantic* gerund.[4] We call these gerunds **gen-gerunds**, as opposed to **regular gerunds** in (2)-(3). To our knowledge, gen-gerunds have not been formally studied before. We refer to structures like (5a) as **gen-gerunds**, because the genitive *-r* marker is attached to the regular gerund *John-er jawa* 'John's going' in the concerned structure. This *-r*, again, takes the nominal *dorkar* 'need' as its complement.

In this paper, we will formally investigate this cluster of facts in Bangla. Our main questions can be articulated as follows:

- Why does what looks like genitive case morphology show up on gerunds?
  The traditional wisdom about English gerundives such as '[*John's building a spaceship*] *upset the neighbors*' (Roberts 1997: (31)) is as follows. The gerund itself has the distribution of a nominal (that contains a VP by definition), but is crucially one that can be a complement to a possessive marker. This background makes the Bangla facts very unusual.
- Why does strong versus weak deontic necessity differ with respect to compatibility with only gen-gerunds?
  This question helps us explore the interaction between the semantics of the subtypes of deontic necessity and subtypes of their gerundive complements.

We will present an analysis couched within the framework of event semantics, and argue that the extra morphology on gen-gerunds is actually a relation binding an individual to a nominal property and a set of eventualities. The combined factors of the semantics of this relation and its interaction with the categorial semantics of the modals themselves will provide the answers to our main questions.

We want to point out the undismissible generality of the pattern of deontic necessity modals requiring gerundive/nominalized complements in multiple languages of the Indian subcontinent. Here is a pair of sentences from Telugu (Dravidian) which shows that the weak necessity modal *uchitam* (literally 'ideal') only allows nominalized complements, similar to Bangla.[5]

(6) a. eppati pani appudu cheey-aDam uchitam
when's work then do-NMLZ ideal
'It's best to do work on time/at its time.'

[3]We will not explore deontic possibility here since that is marked by an ordinary verb *para* ('can') that does not require the presence of gerunds.
[4]We do not mean the traditional *syntactic* categories of gerunds here, which we discuss briefly in §2.1.
[5]Thanks to Sreekar Raghotham (p.c.) for the data.

b. ee roji pani repu cheey-aDam uchitam kaadu
this day's work tomorrow do-NMLZ ideal NEG
'Doing today's work tomorrow is not ideal.'

The paper is organized as follows: §2 lays out the preliminaries in terms of both syntactic assumptions and the difference between strong and weak necessity; §3 lays out the details of our proposal (for the two sub-classes of gerunds and their interaction with the two sub-classes of deontic necessity); §4 discusses some outstanding issues with respect to negation and copulas; §5 concludes.

2. Preliminaries

2.1. A note on the syntax

Gerunds have been argued to be of several types *i.e.,* POSS-ing, PRO-ing, ACC-ing, Ing-*of* (Abney, 1987; Portner, 1992; Siegel, 1998; Grim and McNally, 2015: a.m.o.). Among these, Bangla lacks the ACC-ing and Ing-*of* kinds (see Bhattacharya, 2000). For example, Ing-*of* structures like *The smoking of John*, *The cooking of Lisa* are not distinctly marked, and there is no gerund structure that has its subject marked in accusative case (ACC-ing type):

(7) *Ram-**ke** sigaret kha-wa amar mone ache.
Ram-ACC cigarette eat-GER I.GEN mind.LOC be.3P.PRS
Intended: 'I remember John smoking cigarettes.'

Bangla only has the first two types *i.e.,* POSS-ing and PRO-ing. POSS-ing gerunds are named as such since the subjects of these gerunds are marked with possessive or genitive case as in *John**'s** smoking cigarettes*. Bangla makes use of the genitive *-(e)r* marker in this regard (8). A gerund can be called PRO-ing when its subject is not overt in structure *e.g. John enjoys [PRO studying semantics]*. The predicates *love* and *study* both share the same subject in the their theta grids. Thus, the null caseless PRO is present in order to not violate the θ-criterion. Examples of Bangla POSS-ing and PRO-ing gerunds are as follows:

(8) John-**er** sigaret kha-wa amar mone ache.
John-GEN cigarette eat-GER I.GEN min.LOC be.3P.PRS
'I remember John's smoking cigarettes.'

(9) PRO shokale hnat-a bhalo.
PRO morning.LOC walk-GER good
'Walking in the morning is good.'

In this paper, we will not concern ourselves much with syntactic classes of gerunds, except for formulating the difference between (2) and (5a). We argue that *dorkar* in (2) has the θ-grid consisting of two arguments *viz. John* and *jawa* 'going'. And, *jawa* has one argument which is *John*. Now, following the constraints of the θ-criterion, the subject position of *jawa* will be occupied by a caseless PRO in (2). Therefore, (2) will look like *John-er [PRO jawa] dorkar*. By contrast, (5a) has a structure that is slightly different from (2). *John-er jawa* is structurally a single constituent, where the subject position of *jawa* is occupied by *John*, and not a null PRO. Hence, (5a) will have a structure like *[John-er jawa]-r dorkar*. Thus, our concrete syntactic claim is that (5a) is a POSS-ing gerund, while (2) is a PRO-ing gerund.

2.2. Strong and Weak Necessity

Broadly, modal forces are of two basic types *i.e., necessity* and *possibility*, across languages. Necessity modals involve universal quantification over possible worlds, while possibility modals introduce existential restriction on worlds. They are duals of each other. But, there can be a modal force that lies between the duals *i.e.,* weaker than strong necessity, but stronger than mere possibility. This type is tagged as *weak necessity* in literature. As cited in Matthewson and Truckenbrodt (2018), Horn (1972) described strong necessity as *strong obligation* and weak necessity as *weak obligation* or *suggestion*. Along these lines, consider the following pair (von Fintel and Iatridou 2008: (2,3)).

(10) a. Everybody **ought to** wash their hands; employees **must**.
b. You **ought to** do the dishes but you don't **have to**.

von Fintel and Iatridou (2008) suggest that *ought* embodies weak necessity. In the pair above, *ought* does not impose a strong obligation on a person other than an employee to wash their hands. Hence, *ought* carries a sense of optionality, while in contrast, *must* does not involve any such leniency. *Must* signals a strong obligation. Since there is a strong/weak measurement in terms of a scale of degrees, a strict one-way entailment is expected to hold between *ought* and *must*. The prejacent[6] with a weak necessity modal *i.e.,* 'ought ϕ' can be followed by its strong counterpart *i.e.,* 'must ϕ', but not the vice versa (Silk 2018: (1a,b)).

(11) a. I ought to help the poor. In fact, I must.
b. I must help the poor. #In fact, I ought to.

The same pattern can be observed with *dorkar* 'need' and *uchit* 'ought' as well.

(12) a. Anu-r Delhi ja-wa **uchit**. shotti bolte, or ja-wa **dorkar**.
Anu-GEN Delhi go-GER should. In fact, she.GEN go-GER need
'Anu should go to Delhi. In fact, she must.'
b. Anu-r Delhi ja-wa-(r) **dorkar**. #shotti bolte, or ja-wa **uchit**.
Anu-GEN Delhi go-GER-(GEN) need. In fact, she.GEN go-GER should
'Anu needs to go to Delhi. #In fact, she should.'

Howell (2015) argues for four diagnostics to detect the strong/weak distinction among necessity modals, which are non-veridicality, non-alternative dispelling, additional condition, cross-linguistic polymorphism. For independent grammatical reasons, the non-veridicality test cannot be applied in Bangla. Additionally, the cross-linguistic polymorphism diagnostic, *i.e.,* the use of a morphologically marked mechanism to denote weak necessity that is usually derived from adding a conditional to a strong necessity modal like in French, Greek etc (see von Fintel and Iatridou, 2008: for discussion on this mechanism), is also missing. But, what Bangla shares with other languages is the condition of additionality association with a weak necessity modal. Let's us explore this condition.

Weak necessity modals are in general associated with a secondary teleological modal favor (von Fintel and Iatridou, 2008; Howell, 2015; Matthewson and Truckenbrodt, 2018: a.o.). Consider the following sentences (von Fintel and Iatridou 2008: (6,7)).

[6]Following von Fintel (1997), von Fintel and Iatridou (2008), we use the term *prejacent* to refer to the proposition in scope of a modal.

(13) a. To get to Ashfield, you **have to/must** use Route 2.
b. To get to Ashfield, you **should** use Route 2.

The former sentence can be uttered in a context where taking Route 2 is a required obligation to get to Ashfield. The latter sentence, in contrast, can be uttered in a context where there are other ways to reach Ashfield, but Route 2 is being suggested if the traveller wants to meet certain secondary goals. These goals may include avoiding tolls, experiencing beautiful scenery, taking the shortest route etc. Thus, these goals constitute additional measures that are not mandatory, *i.e.,* they are secondary.

We now need to check if this distinction works for the Bangla counterparts – *dorkar* 'need' and *uchit* 'ought' – as well. Consider a situation where a person wishes to go to the city of Burdwan. There are two routes to reach Burdwan *i.e.,* via an *Express way* and via *G.T. Road*. Both of the sentences below are felicitous in this context.

(14) a. Burdwan jete hole tomar espress way ne-wa(r) dorkar.
Burdwan go.INF be.COND you.GEN Express way take-GER(GEN) need
'You need to take the Express way to get to Burdwan.'
b. Burdwan jete hole tomar espress way ne-wa uchit.
Burdwan go.INF be.COND you.GEN Express way take-GER(GEN) ought
'You ought to/should take the Express way to get to Burdwan.'

But, both statements could be made with different intentions altogether. (14a) is uttered when the only obligatory route to reach Burdwan is via the Express way. On the contrary, (14b) is uttered when the speaker imparts some additional advice, regarding saving time, seeing beautiful roadside scenery etc. Thus, we can get the following contrast where '*dorkar* ϕ' sounds infelicitous with the *because*-extension, while '*uchit* ϕ' is fine with it.

(15) a. ??Burdwan jete hole tomar espress way ne-wa(r) **dorkar**,
Burdwan go.INF be.COND you.GEN Express way take-GER(GEN) need,
karon okhan diye gele tumi shomoy bnachate parbe ar rastar
because there via go.COND you time save.INF can.2P.FUT and road.GEN
charpashe bhalo drishyo-o dekhte pabe.
side.LOC good scenery-FOC see.INF get.2P.FUT
'??You need to/must take the Express way to get to Burdwan, because via that route you can save time and get to see beautiful roadside scenery too.'
b. Burdwan jete hole tomar espress way ne-wa **uchit**, karon
Burdwan go.INF be.COND you.GEN Express way take-GER ought, because
okhan diye gele tumi shomoy bnachate parbe ar rastar
there via go.COND you time save.INF can.2P.FUT and road.GEN
charpashe bhalo drishyo-o dekhte pabe.
side.LOC good scenery-FOC see.INF get.2P.FUT
'You ought to/should take the Express way to get to Burdwan, because via that route you can save time and get to see beautiful roadside scenery too.'

The *because*-extension serves to add the additional information constituting secondary goals. These secondary teleological goals are consistent with an *uchit* utterance, but not with *dorkar* 'need' one. Hence, following von Fintel and Iatridou's (2008) condition on weak necessity, we

can reasonably infer that *dorkar* is a strong necessity modal in Bangla, while *uchit* is the weak counterpart that is sensitive to secondary goals in the context.

3. Analysis

3.1. Regular gerunds and Gen-gerunds

The syntax and semantics of gerundive constructions have been widely debated for decades, and a multitude of approaches have been proposed to account for the diverse body of elements that fall under the umbrella term of 'gerunds'/'nominalizations'. For example, in the semantics, Vendler (1975) argues that POSS-ing gerunds denote *facts*, which are to be kept distinct from propositions (also cf. Reichenbach's (1947) sense of *facts* which he calls events as well); Zucchi (1993), in contrast argues that POSS-ing gerunds signify *states of affairs*, which are propositional in nature; Portner (1992) agrees with the propositional view but defines propositions as sets of situations rather that possible worlds; van Lambalgen and Hamm (2005) distinguish between nominal and verbal gerunds as *fluents* (time-dependent properties) vs. event types/tokens; Grim and McNally (2015) argue for a distinction between subclasses of gerunds (nominal vs. verbal) based on event kinds vs. event tokens. Parallelly, a whole host of syntax literature (Grimshaw, 1990; Alexidou, 2001: a.m.o.) aligns with the view that event nominalizations have argument structure that is overtly expressed, *i.e.,* participants in subject and object positions, that help build the POSS-ing/PRO-ing/ACC-ing differences.

In this paper, we adopt one of the main prevailing views of gerunds as properties of eventualities, *i.e.,* sets of events. This view is articulated in Portner (1991), following Parsons (1990, 1995), using Bach's (1986) term 'eventualities' (meant to subsume accomplishments, achievements, states, processes). We will argue that this approach helps us to best gain an understanding of the interaction between gerunds and deontic modals described above.

A regular gerund such as *jawa* 'going' is an object of type $\langle v,t \rangle$ with the following formulation:

(16) $[\![\text{jawa}]\!]^w = \lambda e_v.\mathbf{going}_w(e)$

This semantics postulates that the gerund *jawa* is a set of going-events.

A gen-gerund, on the other hand, has the additional *-r* morphology which, as we saw above, is incompatible with weak necessity (unlike its regular counterpart) but compatible with strong necessity (like its regular counterpart). Before we explore the interaction with deontic necessity, let us explore the semantics of a gen-gerund. We begin by arguing that there is a distinction in meaning, albeit subtle[7], between the following two sentences:

(17) a. John-er jawa dorkar.
John-GEN go.GER need
'John needs to go.'

b. John-er jawa-**r** dorkar.
John-GEN go.GER-GEN need
Lit: 'The need of John's going is the need that exists.'

For (b), we can posit a literal meaning such as the following: "John's going need is the need that

[7]Among the speakers we surveyed, many found no difference between the two sentences, while some (including the authors' own intuitions) find a subtle difference between the two. We leave a detailed experimental study testing both constructions with controlled contexts for future work.

exists." To paraphrase, the going-need is a definite entity that is claimed to exist. In contrast, (a) is a statement about the general need of John's going. We can find an empirical foothold for this claim. The definite classifier *-ta* (more about *-ta* in §3.2) cannot attach to *John-er jawa dorkar*, since this does not carry any nominal status. However, the same classifier can attach to *John-er jawa-r dorkar* as it already has a nominal status on its own, yielding the interpretation of a definite need.

(18) a. *John-er jawa dorkar-ta amar mone hoyechilo.
John-GEN go.GER need-CL I.GEN mind.LOC happen.3P.PRF.PST
Intended: 'I thought about the need of John's going.'
b. John-er jawa-r dorkar-ta amar mone hoyechilo.
John-GEN go.GER-GEN need-CL I.GEN mind.LOC happen.3P.PRF.PST
'I thought about the need of John's going.'

The presence of the *-r* marking on the gerund thus results in the definite description reading, while without it, a simple property of necessity holds of John. The question then is, what is the underlying mechanism that creates the two distinct classes of gerunds?

We propose that the *-r* morpheme maps onto a relation definable as follows, crucially containing an *iota* operator:

(19) $[\![\text{-r}]\!]^w = \lambda P_{\langle e,t\rangle} \lambda g_{\langle v,t\rangle} . \iota x [P_w(x) \wedge \textbf{HOLDS-OVER}_w(x, g)]$

The relation HOLDS-OVER$_w$ (type: e→ (v→t)) holds between a unique individual (the 'need' itself in this case) and a set of eventualities in *w*. In what follows, we will argue that this relation embodied by *-r* first applies to the deontic necessity modal, and consequently the result is a function that takes the gerund (and the subject) as its argument. The vital point then is that the distinctive semantics between the constructions in (17a) and (17b) has its roots in the following interaction of the categorial status of the modal and the gerund: in (17a), the modal is *predicative* and takes the gerund as an argument; in (17b), the modal is a *nominal argument* of the gerund itself, which is why we see explicit genitive marking on the gerund. We first discuss the semantics of modals and then provide the compositional interactions to represent these proposals.

3.2. Strong necessity and regular/gen-gerunds

We posit the view that both strong and weak necessity modals quantify over sets of eventualities. While this approach does align our analysis with an event-relative theory of modality (cf. Hacquard 2006, 2010), we do not, however, project conversational backgrounds such as modal bases and ordering sources from events of evaluation rather than worlds of evaluation. We appeal to a hybrid analysis of eventualities and worlds to explain the Bangla facts.

The core distinction between the two flavors of strength of necessity lies in the presence or absence of additional restrictions, following von Fintel and Iatridou's (2008) (henceforth, vFI) insight about superimposing *a pair* of ordering sources onto a Kratzerian framework of modality. vFI argue that a strong necessity modal is sensitive only to the primary ordering source in the context, while a weak necessity modal uses a secondary ordering source to rank the worlds already picked out by the primary ordering source (though see Rubinstein 2012, 2014 for a discussion of problems with such a formulation). This view raises the possibility of the context providing an ordered sequence of ordering sources; strong necessity entails being sensitive to

just the designated initial sequence, while weak necessity would be sensitive to later sequences as well.

We assume that a context provides for each modal a modal base f (Kratzer, 1981, 1991; Portner, 2006: a.m.o.). Here, $\bigcap f_{deon}(w)$ denotes a deontic modal base, the set of worlds where all the normative rules in w are true. With respect to ordering sources, vFI provide a sketch of the ordered sequence provided by the context: $\langle\langle g_1,...,g_i\rangle,\langle g_{i+1},...,g_k\rangle\rangle$. We assume that the context also has the function that picks the best worlds in a set of worlds – $Best_g(w)$. With this infrastructure in place, we formulate the meaning of a strong necessity modal predicate such as *dorkar* as follows:

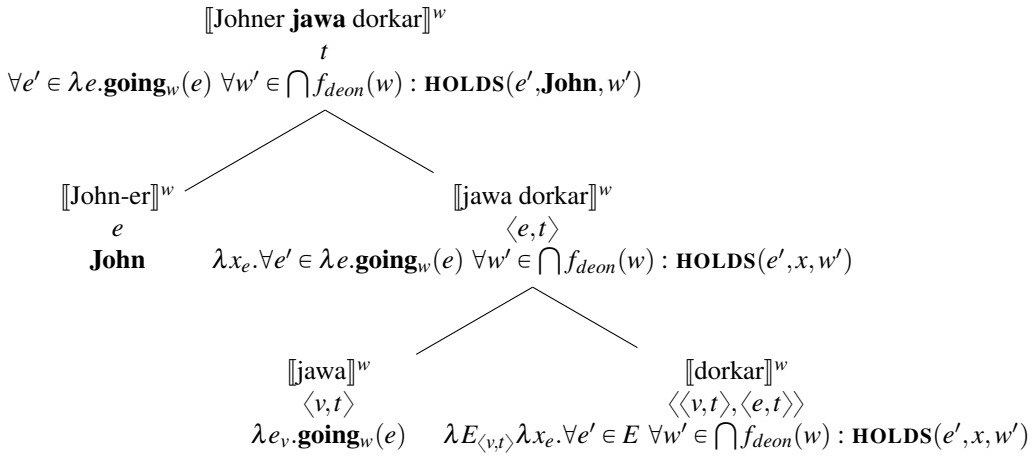
(20) $[\![\text{dorkar}_{pred}]\!]^w =$
$\lambda E_{\langle v,t\rangle}\lambda x_e.\forall e' \in E\ \forall w' \in \bigcap f_{deon}(w) : \textbf{HOLDS}(e',x,w')$

We take the relation $\text{HOLDS}(e,x,w)$ to denote the fact that an event e holds of an individual x in w (cf. the discussion of Davidsonian vs. Kimian states in Maienborn 2005, 2008). The statement 'an event e holds of an individual x in w' means that the subject of the event e in w is the individual x. Consequently, the whole sentence, such as (2), containing both the modal and the gerund has the following meaning:

(21) $[\![\text{John-er jawa } \textbf{dorkar}]\!]^w =$
$\forall e' \in \lambda e.\textbf{going}_w(e)\forall w' \in \bigcap f_{deon}(w) : \textbf{HOLDS}(e',\textbf{John},w')$

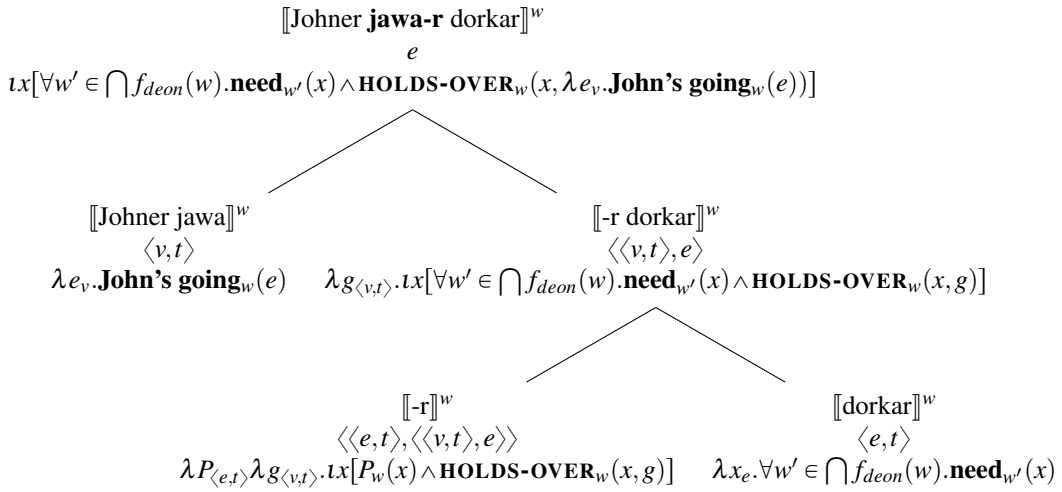
Using this strong necessity modal makes the claim that the prejacent is true in all worlds in $Best_{g_i}(w)(\ldots(Best_{g_1}(w)(f(w)))$. The HOLDS relation ensures that the event of going holds of the individual *John* in all the worlds belonging to the deontic modal base in w. We call this the **predicative** use of *dorkar*, since the modal is taking the gerund (and the subject) as its argument. The full compositional derivation is provided below:

(22)



Recall from (5a) that *dorkar* is compatible with gen-gerunds as well. We propose that there is a crucial difference between the semantics of (2) posited above and (5a). In the latter, the *-r* relation requires a property as its first argument that is satisfied by what we call the **nominal** use of *dorkar*.

(23)



The resultant meaning is a definite description. The definite entity is the property of need/ necessity (denoted by the nominal) of going by the individual subject of the set of eventualities (denoted by the gerund). This nuance in meaning arises due to the **HOLDS-OVER** relation introduced by the *-r* morpheme, which on surface may be homophonous with simple genitive case marking on nominals in Bangla but in the case of its appearance on a gerund denotes a relation between a unique necessity/need and the set of eventualities (of *John's going*, in this case) that this necessity holds over.

Another vital difference between the predicative use (22) and the nominal use (23) use of *dorkar* lies in the semantics of *dorkar* itself. In (23), 'need' is a property that is an argument of a predicate, as opposed to being a predicate that takes a property as its argument (22). We defined the nominal use of the modal (in (23)) with the same modal quantificationals tools as for the predicative use, but they differ in type (<<vt>,<et>> for the predicative in (20) vs. <et> for the nominal):

(24) $[\![\text{dorkar}_{nom}]\!]^w = \lambda x_e.\forall w' \in \bigcap f_{deon}(w).\textbf{need}_{w'}(x)$

We have two pieces of evidence to substantiate the claim that 'need' can double up as both a property and a property-taking predicate in Bangla.

Our first piece of evidence comes from the domain of classifiers. The general classifier *-ta*, which is typically used for canonical count nouns and certain mass nouns (Bhattacharya, 1999; Dayal, 2012; Simpson and Biswas, 2016), marks the presence of an unique maximal entity. For example:

(25) Rahul gari-**ta** beche di-lo
Rahul car-CL sell give-3P.PRES
'Rahul sold the car.'
(with the presupposition that there is maximality and uniqueness in the contextual domain of cars)

Now, we observe that *-ta* can appear on *dorkar* very productively:

(26) a. Rahul-er amar **dorkar-ta** mon-e por-lo
Rahul-GEN my need-CL mind-LOC fall-3P.PRES

'Rahul remembered my need.'

b. Aaloo-r **dorkar-ta** bere ge-che
potato-GEN need-CL increase go-3P.PRES.PERF
'The need for potato has increased.'

Apart from the presence of the classifier, a few other elements also delineate the categorial status of the modal as a nominal. For example, the possessive pronoun in (26a) takes the nominal as its argument, and the implied *for*-modification (implying the need for the genitive-marked subject) in (26b) also targets the nominal modal.

Our second piece of evidence comes from a cross-linguistic comparison in the adjectival domain.[8] Both Bangla and its closely related neighbor Hindi-Urdu have adjectives that are morphologically related and semantically similar to the word for *need*. For example:

(27) Bangla
Rahul **dorkari** kichu kaagoj hariye-che
Rahul important some papers lose-3P.PRES.PERF
'Rahul has lost some important papers.'

(28) Hindi-Urdu
Rahul-ne kuch **zaruuri** kagazat kho diya hain
Rahul-ERG some important papers lose give COP.3P.PRES
'Rahul has lost some important papers.'

The adjective *zaruuri* (counterpart of *dorkari*) is derivationally related to the nominal *zaruur* 'need', the Hindi-Urdu counterpart of *dorkar*.[9] This fact leads us to believe that the nominal property status of the modal is real, since it is morphologically very close to semantically similar adjectival properties.

3.3. Weak necessity and regular/*gen-gerunds

As mentioned above, we adopt an approach to weak necessity in which the "weakness" arises from the sensitivity of the modal to the later sequences in ordered sequence of ordering sources provided by the context. This sensitivity results in the secondary ranking of the worlds among the worlds already picked as favored by the primary ordering source. Quantifying over this narrower set of worlds further filtered by additional considerations of diverging goals, extra evidence, etc, weakens the force of the modal.

Uchit, in our analysis, has the same semantics as *dorkar*. The compositional interaction of the regular gerund and weak necessity *uchit* is also the same as that with the predicative use of *dorkar*. The modal force is still universal, while the difference lies in the ordering source sequences employed.

(29) $[\![\text{uchit}]\!]^w =$
$\lambda E_{\langle v,t\rangle} \lambda x_e . \forall e' \in E\ \forall w' \in \bigcap f_{deon}(w) : \textbf{HOLDS}(e', x, w')$

Thus, one of our primary data points (cf. (3)) has the following meaning:

[8] Special thanks to Ashwini Deo (p.c.) for pushing us in this direction.

[9] It is a separately interesting fact that both languages use the suffix *-i* to form adjectives from nouns.

(30) $[\![$Johner jawa **uchit**$]\!]^w$=
$\forall e' \in \lambda e.\mathbf{going}_w(e) \forall w' \in \bigcap f_{deon}(w) : \mathbf{HOLDS}(e', \mathbf{John}, w')$

Crucially however, using this weak necessity modal makes the claim that the prejacent is true in all worlds in $Best_{g_k}(w)(\ldots(Best_{g_{i+1}}(w)(Best_{g_i}(w)\ (\ldots(Best_{g_1}(w)(f(w)))))))$. As before, the HOLDS relation ensures that the event of going holds of the individual *John* in all the worlds belonging to the deontic modal base in *w*. The full derivation would be similar to (22).

Now, recall that in contrast to strong necessity, *uchit* is not compatible with gen-gerunds, repeated below from (5b):

(31) *Anu-r ja-wa-**r uchit**.
Anu-GEN-GER go-GER should
'Anu should go.'

We place this incompatibility squarely in the absence of a nominal use of *uchit*. *Uchit* can never denote a nominal property, and has only one use – that of a property-taking predicate, described above. Thus, the relation denoted by *-r* in gen-gerunds, which requires a property holding of an individual subject of the set of eventualities as an argument, can never compose with *uchit*, leading to ungrammaticality.

The key pieces of evidence above that worked in favor of *dorkar*'s nominal status can be now shown to work against such a purported nominal status for *uchit*. Keeping the empirical facts minimally different, we see that *uchit* cannot host the classifier *-ta*, cannot be taken as an argument by a possessive pronoun, and cannot be targeted by the implied *for*-modification.

(32) a. *Rahul-er amar **uchit-ta** mon-e por-lo
Rahul-GEN my should-CL mind-LOC fall-3P.PRES
Intended: 'Rahul remembered what I should do.'
b. *Aaloo-r **uchit-ta** bere ge-che
potato-GEN need-CL increase go-3P.PRES.PERF
Intended: 'The necessity for potato has increased.'

Thus, the semantics and categorial statuses of strong and weak necessity modals and their interaction with regular gerunds and gerunds with special morphology (gen-gerunds) helps explain the distributional constraints on gerunds in deontic ground.

4. Outlook: Negation and Copulas

The behavior of the complex consisting of a regular or gen-gerund and a strong or weak deontic modal has some other remarkable properties, arising out of configurations with negation and (c)overt copulas in Bangla. Some of these observations are open issues we raise, and we leave full resolutions of these issues for future work.

4.1. The curious case of negation

Apart from (in)compatibility with regular gerunds and gen-gerunds, another property also divides strong and weak necessity – their interaction with negative markers. Consider the following paradigms:

(33) a. *Rahul-er ja-wa dorkar nei
Rahul-GEN go-GER need NEG.PRES

Intended: 'Rahul doesn't need to go.'

b. Rahul-er ja-wa-r dorkar nei
Rahul-GEN go-GER-GEN need NEG.PRES
'The need of Rahul's going does not exist.'

The negative existential copula *nei* can only co-occur with regular gerunds and not gen-gerunds. Sketching an idea in informal terms, this incompatibility can be explained within our analysis as follows: as we saw in the derivation for (23), the gen-gerund and modal complex yields a definite description of type e; the negative existential copula *nei* then possibly negates the existence of this definite entity in (33b), while given its very nature, *nei* cannot function as propositional negation, which is what would be required in (33a) (cf. the derivation in (22)).

In addition, we notice that *uchit* cannot co-occur with *nei* under any circumstances, and instead combines with a different form of negation (*noy*), which again *dorkar* cannot combine with:[10,11]

(34) a. *Rahul-er ja-wa uchit nei
Rahul-GEN go-GER should NEG.PRES
Intended: 'Rahul should not go.'

b. Rahul-er ja-wa uchit noy
Rahul-GEN go-GER should NEG
'Rahul should not go.'

c. *Rahul-er ja-wa-(r) dorkar noy
Rahul-GEN go-GER-GEN need NEG
Intended: 'Rahul doesn't need to go/Rahul's going need does not exist.'

Thus, we see that the interaction of *dorkar/uchit* with the two forms of the negative copula are exact mirror images of each other. This observation raises the crucial questions: what is the difference between *nei* and *noy*, and how does it feature in the interactions here? Below, we provide a characterization of the two forms of negation, but we leave a formal analysis of the composition with the gerund-modal complex for future work.

We investigate the properties of *nei* and *noy* with the following set of diagnostics: stage-level predicates and individual-level predicates, with both the nominal-classifier complex and proper names in subject position. We find the existence of four kinds of readings: a kind reading (KIND), a definite reading (DEF), a temporally delimited reading (TD), and a habitual reading (HAB).[12]

With s-level predicates, with proper names as subjects, *nei* only allows a temporally delimited reading. *noy*, on the other hand, allows both a delimited and a habitual reading.

[10]Bangla negation is famously very complicated (Ramchand, 2004: etc.), spanning various forms, and draws on many syntactic and semantic distinctions, all of which we do not go into here.

[11]Technically, *uchit* is also compatible with the default post-verbal finite negation marker *na*; while *dorkar* is incompatible with it, as shown below in (i). This fact currently remains shrouded in mystery.

(i) a. Rahul-er ja-wa uchit na.
Rahul-GEN go-GER should NEG
'Rahul should not go.'

b. *Rahul-er ja-wa dorkar na.
Rahul-GEN go-GER need NEG
Intended: 'Rahul does not need to go.'

[12]Terminology due to Deo (2013).

(35) a. Anu phnaka nei.
Anu free NEG.PRES
'Anu is not free right now.' (TD)
b. Anu phnaka noy.
Anu free NEG.COP
'Anu is not free right now.' (TD)
'Anu is not generally free.' (HAB)

With i-level predicates, with proper names as subjects, to negate the predicate, Bangla obligatorily has to use *noy* with a habitual reading. But, *nei* is impossible in these constructions.

(36) a. *Anu lomba nei.
Anu tall NEG.PRES
Intended: 'Anu is not tall.'
b. Anu lomba noy.
Anu tall NEG.COP
Anu is not tall. (HAB)

With s-level predicates, with the nominal-classifier complex as subject, both *nei* and *noy* are grammatical. But, *noy* provides both the KIND and DEF readings, whereas *nei* gives rise to a DEF+TD reading only.

(37) a. meye-ra phnaka nei.
girl-CL free NEG.PRES
'Girls (at our home) are not free right now.' (DEF+TD)
b. meye-ra phnaka noy.
girl-CL free NEG.COP
'Girls (in general) are not free.' (KIND)
'Girls (at our home) are not free.' (DEF)

With i-level predicates, with the nominal-classifier complex as subject, the pattern is quite different from the pattern with the s-level plus nominal-classifier complex configurations. *Nei* is ungrammatical, while *noy* allows both the KIND and DEF readings.

(38) a. *meye-ra lomba nei.
girl-CL tall NEG.PRES
Intended: 'Girls are not tall.'
b. meye-ra lomba noy.
girl-CL tall NEG.COP
'Girls (in general) are not tall.' (KIND)
'Girls (in my locality) are not tall.' (DEF)

Summing up:

		i-level	s-level
nei	with names	*	TD
	nominal-CL complex	*	DEF+TD
noy	with names	HAB	TD HAB
	nominal-CL complex	KIND DEF	KIND DEF

4.2. The curious case of the null copula

The gerund-modal complexes we are studying have an interesting interaction with the overt copulative form *ache* and what we call the zero copula form ∅. Consider the following paradigm, in which the copulative form *ache* can be optional in both of the following sentences.

(39) a. Rahul-er jawa dorkar ∅/ ache$_{be}$
Rahul-GEN go.GER need ∅/ be.3P.PRS
'Rahul needs to go.'

b. Rahul-er jawa-r dorkar ∅/ ache$_{exist}$
Rahul-GEN go.GER-GEN need ∅/ exist.3P.PRS
'The need of Rahul's going exists.'

In the former instance, the strong necessity modal *dorkar* has a predicative status, And, *ache* can be said to be equivalent to *be*. We will refer to this copula as *be*-copula, which has the semantics of an identity function. The existence of *ache* as a *be*-copula is prevalent in Bangla.

(40) Rahul lomba ache.
Rahul tall be.3P.PRS
'Rahul is tall.'

But, (39b) instantiates another avatar of *ache* which we refer to as *exist*-copula. We assume that this *ache* is an existential predicate of type $\langle e,t\rangle$. As per our analysis, the gen-gerund construction *Rahul-er jawa-r dorkar* is a definite description of type e. Now, this *exist*-copula *viz. ache* composes with it yielding us the expression of type t. Since Bangla's typological status as a null-copula language is well-known, we conclude that both the *be*-copula and *exist*-copula can be optional in an unmarked present tense structure. But, both the copula avatars must be overt in a past tense form.

(41) a. Rahul-er jawa dorkar chilo$_{be}$
Rahul-GEN go.GER need be.3P.PST
'Rahul needed to go.'

b. Rahul-er jawa-r dorkar chilo$_{exist}$
Rahul-GEN go.GER-GEN need exist.3P.PST
'The need of Rahul's going existed.'

But, as opposed to *dorkar*, the weak necessity modal *uchit* 'should' does not attest any form of overt copula in the present form (42a), whereas it allows an overt *be*-copula in past tense form,

which is shown in (42b).

(42) a. *Rahul-er jawa uchit ache$_{be/exist}$
Rahul-GEN go.GER should be/exist.3P.PRS
Intended: 'Rahul should go.'
b. Rahul-er jawa uchit chilo$_{be}$
Rahul-GEN go.GER should be.3P.PST
'Rahul should have gone.'

Thus, there appear to be non-trivial interactions between tense, *be* vs. *exist* copulas, and the strong vs. weak flavor of deontic necessity. We leave a formal account of these intriguing puzzles for our future research.

5. Conclusion

This paper presented and formally investigated various novel facts in the landscape of the interaction between gerundive constructions and deontic necessity in Bangla. Many previous studies focus on the forms of the modals themselves, but here we explore the modal-complement interaction as well. Both strong and weak deontic necessity only allow gerund complements, and are furthermore vitally divided on choosing between two semantic sub-classes of gerunds: regular and gen-gerunds.

Taking stock, the questions we started out with now have answers. For our first question – why does what looks like genitive case morphology show up on gerunds – we argued that the answer lies in the semantics of the *-r* morpheme. We argued that *-r* is a relation between a deontic necessity and a set of eventualities that this necessity holds over. The presence of this morphology on a gerund turns it into a definite description of necessity. The composition of the gen-gerund-strong necessity modal complex thus differs fundamentally from that of the regular gerund-strong necessity modal complex: in the former, the modal is a nominal property that is an argument of the gerund itself, while in the latter, the modal is a property (of eventualities)-taking predicate that takes the gerund (a property of eventualities) as an argument.

Our second question was, why does strong versus weak deontic necessity differ with respect to compatibility with only gen-gerunds? Given what appears to be an areal feature in the South Asian linguistic area, we showed that weak deontic necessity does not have both the property and property-taking predicate avatars that strong deontic necessity has, but just the latter. This fact compositionally rules out the possibility of a gen-gerund ever being the complement of weak necessity. We provided pieces of evidence for the relevant distinctions from the domain of classifiers, possessive pronouns and implied *for*-modification.

Finally, we highlighted some interesting possible extensions of our morphosemantic account with respect to the interactivity between negation and copulas and the gerund-modal complexes. Several open questions remain, specifically with respect to different forms of negation (*nei* vs. *noy*) and their yeilding of different readings (kind, definite, temporally delimited, and habitual) across s-level and i-level predicates, and similar behavior with overt versus the zero copula forms as well. We leave a full investigation integrating these questions into our current formal analysis cohesively for future work. Overall, this work argued for an interaction of the semantics of gerunds and deontic modals within an approach containing quantification over both worlds and eventualities, with an eye towards explaining this specific form of non-finite complementation of modals and their nominal versus predicative uses.

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