

## On root modality and thematic relations in Tagalog and English\*

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**Abstract** The literature on modality discusses how context and grammar interact to produce different flavors of necessity primarily in connection with functional modals e.g., English auxiliaries. In contrast, the grammatical properties of lexical modals (i.e., thematic verbs) are less understood. In this paper, we use the Tagalog necessity modal *kailangan* and English *need* as a case study in the syntax-semantics of lexical modals. *Kailangan* and *need* enter two structures, which we call ‘thematic’ and ‘impersonal’. We show that when they establish a thematic dependency with a subject, they express necessity in light of this subject’s priorities, and in the absence of an overt thematic subject, they express necessity in light of priorities endorsed by the speaker. To account for this, we propose a single lexical entry for *kailangan / need* that uniformly selects for a ‘needer’ argument. In thematic constructions, the needer is the overt subject, and in impersonal constructions, it is an implicit speaker-bound pronoun.

**Keywords:** modality, thematic relations, Tagalog, syntax-semantics interface

### 1 Introduction

In this paper, we observe that English *need* and its Tagalog counterpart, *kailangan*, express two different types of necessity depending on the syntactic structure they enter. We show that thematic constructions like (1) express necessities in light of priorities of the thematic subject, i.e., *John*, whereas impersonal constructions like (2) express necessities in light of priorities of the speaker.

- |     |  |                   |
|-----|--|-------------------|
| (1) | John needs there to be food left over. | <i>Thematic</i>   |
| (2) | There needs to be food left over.      | <i>Impersonal</i> |

The same pattern holds in Tagalog; the necessity modal *kailangan* enters a thematic and impersonal construction and exhibits the same syntax-flavor correspondence as English *need*. Our analysis of this pattern derives this mapping using a

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single lexical entry for *need/kailangan* (henceforth *NEED*). We propose that *NEED* always selects for an individual argument and expresses necessities in light of this argument's desires. In thematic constructions, the overt thematic subject satisfies this role. In impersonal constructions, an implicit speaker-bound variable satisfies this role, an idea we borrow from the literature on experiencer predicates (Pearson 2013a,b).

The main empirical contribution of this work is to identify a new, syntactically-conditioned contrast in modal flavor in the domain of lexical modals. The main theoretical insight is to connect the syntax-flavor correspondence observed with *NEED* to similar behavior exhibited by other experiencer predicates such as predicates of taste (e.g., *tasty, fun*) and predicates of perception (e.g., *seem*).

The paper is organized as follows. Section 2 provides some background on modal flavor. Section 3 presents our findings on Tagalog *kailangan* and English *need*. Section 4 provides our account of *NEED*'s syntax-flavor correspondence, drawing a correlation with other types of experiencer predicates. Section 5 discusses open questions and future directions.

## 2 Background

Modals can express many varieties or 'flavors' of possibility or necessity. For example, (3), which contains the necessity modal *have-to*, can be understood as an *epistemic* necessity i.e., a necessity in light of a body of information (e.g., the information that Sue isn't at the park and that she's always either at the park or at home). Alternatively, it can be understood as a *deontic* necessity i.e., a necessity in light of a rule (e.g., one imposed by Sue's parents for where she can be at 8 pm).

(3) Sue has to be at the home.

There have been many proposals for how modal flavors are differentiated. Some have argued that different flavors correspond to different syntactic structures. In an early work by Ross (1969), different syntactic structures are argued to underlie the epistemic vs. root distinction (where root subsumes the deontic, teleological, circumstantial, and ability flavors, among others); epistemic modals are analyzed as sentential operators, while root modals are analyzed as transitive predicates, taking an external argument. This position is also taken in Zubizarreta 1982 and Roberts 1985, which analyze epistemic modals as raising and root modals as control. A slightly different view is found in Brennan 1993, which argues that both epistemic modals and a subclass of deontics with an 'ought-to-be' sense are sentential operators, while other root modals, including ability modals and deontics with an 'ought-to-do' sense, denote properties of individuals.

Other works have questioned the idea that flavor distinctions are syntactically represented; for example, Wurmbrand (1999) argues that modal auxiliaries are uniformly raising verbs, regardless of what flavor of modality they express. Examples like (4), which has an expletive subject but supports a root interpretation, suggest that even root modal auxiliaries realize a raising structure.

(4) There can be a party as long as it's not too loud. (Wurmbrand 1999: 12)

Wurmbrand (1999) instead proposes that different flavors of modality are determined contextually, specifically, by Kratzer's (1981, 1991) conversational backgrounds. Kratzer's work can be seen as a response to lexicalist approaches to modal flavor i.e., approaches that posit homophonous modals with predetermined epistemic, deontic, circumstantial, etc. interpretations. Kratzer shows that the sheer number of modal flavors that arise in the course of conversation make this view untenable. Instead, she proposes that modal flavor is fixed by contextually-supplied parameters, a view we present in greater detail in Section 4.

The argument against a purely lexicalist approach still stands, but more recent cross-linguistic findings have shown that there are robust syntax-flavor correspondences resembling those proposed by early works. Cinque (1999) observes in many unrelated languages that the morphological markers of epistemic modality appear farther from verb roots than markers of root modality. Specifically, he finds the universal hierarchical ordering in (5), where epistemic modals are merged above tense and root modals are merged below aspect.

(5)  $MOD_{epistemic} > TENSE > ASP > MOD_{root}$

Hacquard (2010) attempts to explain Cinque's generalization without lexical entries with predetermined flavor and height; she proposes that auxiliaries have a single underspecified denotation, which can be inserted high or low in the structure. Under her analysis, modals come to have epistemic or root flavor because of their dependency on the immediately c-commanding event-binding functional head. We briefly discuss similarities between our proposals in Section 5.1.

Despite the extensive literature on modal expressions and auxiliaries in particular, many questions remain open. For various modal expressions, one can ask: which flavor distinctions are determined contextually and which are determined grammatically? Our case study addresses this question for a particular type of lexical modal, *NEED*. We show how the syntactic structures that *NEED* enters and the thematic dependencies it establishes in them determine the flavor of necessity it can express. Tagalog is a useful language in which to examine *NEED*-type modals because its case marking system makes it easy to discern the different thematic dependencies established in different constructions.

### 3 Empirical generalizations

In this section, we describe our diagnostics for distinguishing impersonal and thematic NEED constructions in Tagalog and English and present the contexts we used to illustrate how the syntactic structure constrains NEED's modal flavor. We arrive at the generalization in (6) regarding syntactic structure and modal flavor, which is what our proposal in Section 4 explains.

(6) **Syntax-flavor mapping generalization**

Impersonal constructions express speaker-oriented necessities but not purely subject-oriented necessities; thematic constructions express subject-oriented necessities but not purely speaker-oriented necessities.

We first present our findings on Tagalog *kailangan*, whose impersonal and thematic constructions are distinguished by case marking on nouns phrases. Then, we present our findings on English *need*, whose two constructions we distinguish with complement-clause size and subject animacy.

Before proceeding, we want to clarify one potential terminological confusion. Although we refer to certain NEED-constructions as 'impersonal', we don't intend this to mean that the verb does not have any thematic arguments in these constructions. Indeed, our analysis is that there is a needer argument present, albeit an implicit one. We use the term 'impersonal' to mean that NEED does not establish a thematic dependency with the overt subject DP.

#### 3.1 Tagalog *kailangan*

Tagalog clauses are verb-initial, and a verb's voice affix (glossed AV for 'Actor Voice,' TV for 'Theme Voice' etc.) causes the verb's thematic arguments to be case marked in a particular way (Schachter & Otnes 1972: §5). The structural minimal pair in (7-8)<sup>1</sup> has the same verbs (*kailangan*, 'need,' and *ma-tulog*, 'sleep') in the same voices, but the case marking on 'Juan' differs between examples.<sup>2</sup> This suggests a difference in grammatical dependencies.

- (7) *Kailanga-ng ma-tulog si-Juan.*  
NEED-COMP AV-sleep SUBJ-Juan

Approx. 'It is required that Juan sleep'

*Impersonal*

1 Abbreviations: AV – 'Actor Voice,' COMP – 'Complementizer,' GEN – 'Genitive,' OBJ – 'Object,' PFV – 'Perfective,' SUBJ – 'Subject'

2 In our examples, word order also appears to distinguish between the two constructions, but this is not a meaningful difference because post-verbal word order is flexible; case marking continues to distinguish between constructions in examples where word order is the same.

- (8) Kailangan ni-Jua-ng ma-tulog.  
 NEED GEN-Juan-COMP AV-sleep  
 Approx. ‘Juan feels a need to sleep’ *Thematic*

The *si*-marking on ‘Juan’ in (7) shows that it is an argument of the embedded verb *ma-tulog* (‘sleep’) which, with its AV-inflection, realizes a *si*-marked sleeper. In contrast, the GEN-marking on ‘Juan’ in (8) must be from *kailangan* itself, which realizes a GEN-marked needer (see Asarina & Holt 2005 for more details).

Preservation of idiomaticity and animacy restrictions support the conclusion that the case alternation correlates with different thematic dependencies. Tagalog has the subject-verb idiom shown in (9a); the idiomatic interpretation is only retained when it is embedded under *kailangan* in the impersonal construction as in example (9b). The thematic constructions in (9c) has only a literal and odd interpretation.

- (9) a. Um-init ang-ulo ni-Juan.  
 PFV.AV-get.hot SUBJ-head GEN-Juan  
 ‘Juan got angry’ (lit. ‘Juan’s head got hot’) *Idiom*
- b. Kailanga-ng um-init ang-ulo ni-Juan.  
 NEED-COMP AV-get.hot SUBJ-head GEN-Juan  
 Approx. ‘It is required that Juan get angry’ *✓ Impersonal*
- c. \* Kailangan ng-ulo ni-Jua-ng um-init.  
 NEED GEN-head GEN-Juan-COMP AV-get.hot  
 Approx. ‘Juan’s head feels a need to get hot’ *\*Thematic*

Next, the minimal pair in (10-11) shows that *kailangan* allows for an inanimate subject in the impersonal construction but not in the thematic construction<sup>3</sup>; this too suggests that the thematic construction involves a thematic dependency between *kailangan* and the subject, while the impersonal construction does not.

- (10) Kailanga-ng um-andar ang-sasakyan.  
 NEED-COMP AV-work SUBJ-car  
 ‘The car needs to work’ *Impersonal, ✓ inanimate*
- (11) \* Kailangan ng-sasakya-ng um-andar.  
 NEED GEN-car-COMP AV-work  
 ‘The car feels a need to work’ *Thematic, \*inanimate*

<sup>3</sup> In some contexts, inanimate subjects in thematic constructions might be licensed by metonymy (e.g., *school* for *students*) or personification; we are reporting on the spontaneous judgement that inanimate subjects sound odd.

Impersonal construction Subject-oriented necessity	Impersonal construction Speaker-oriented necessity
Thematic construction Subject-oriented necessity	Thematic construction Speaker-oriented necessity

**Table 1**

Even in cases where both members of the minimal pair are well-formed, the two constructions express different flavors of necessity. We examined which constructions could be used to express necessity in light of priorities belonging to the speaker ('speaker-oriented necessity') and which constructions could be used to express necessity in light of priorities belonging to the subject ('subject-oriented necessity'). We presented Tagalog native speakers with constructed contexts and impersonal/thematic minimal pairs (presented as productions of non-native speakers, who are learning how *kailangan* is used). The contexts we provided describe a tension between the speaker's and the thematic subject's priorities, thus ensuring that speaker- and subject-oriented necessities do not overlap.

We were interested in two syntactic structures (impersonal and thematic) and two modal flavors (speaker- and subject-oriented), resulting in four possible syntax-flavor combinations shown in Table 1.

Below are two contexts that describe a conflict in priorities and the impersonal–thematic minimal pairs we presented; in both contexts, the two constructions are attempts to express a necessity that follows only from the speaker's priorities or only from the subject's.

#### **Context preceding statement of purely speaker-oriented necessity**

*Context 1: Juan is hungry. His mother gave him a plate of food, and although she knows he intends to eat it all, she told him to set some food aside for his brother. She tells her friend...*

- (12) Kailanga-ng mag-tira si-Juan ng-pagkain.  
NEED-COMP AV-set.aside SUBJ-Juan OBJ-food  
'It is required that Juan set aside food' *✓ Impersonal*
- (13) # Kailangan ni-Jua-ng mag-tira ng-pagkain.  
NEED GEN-Juan-COMP AV-set.aside OBJ-food  
'Juan feels a need to set aside food' *# Thematic*

In the context above, the speaker's priorities include that all of her children eat, while the thematic subject Juan's priorities include that he has all the food. The

Impersonal construction Subject-oriented necessity	Impersonal construction Speaker-oriented necessity
Thematic construction Subject-oriented necessity	Thematic construction Speaker-oriented necessity

**Table 2**

minimal pair in (12-13) reveals that the impersonal construction can be used to express necessity in light of priorities that only the speaker holds, while the thematic construction cannot. In other words, the thematic construction can't help but express necessity in light of the thematic subject's priorities, rendering it unacceptable in this context. We illustrate the inverse pattern with the following context.

**Context preceding statement of purely subject-oriented necessity**

*Context 2: Juan has always smoked, but now he's sick. The doctor ordered him to quit, but Juan cannot resist, and he told his doctor that he will not quit. The doctor says to Juan's wife...*

- (14) # *Kailanga-ng ma-nigarilyo si-Juan.*  
 NEED-COMP AV-smoke SUBJ-Juan  
 'It is required that Juan smoke' #*Impersonal*
- (15) *Kailangan ni-Jua-ng ma-nigarilyo.*  
 NEED GEN-Juan-COMP AV-smoke  
 'Juan feels a need to smoke' ✓*Thematic*

Just like Context 1, Context 2 describes conflicting priorities. The speaker's (i.e., doctor's) priorities include that Juan quits smoking while the thematic subject's priorities include that he satisfy his addiction. The minimal pair in (14-15) shows that the thematic construction can express necessities in light of priorities that only the subject holds, while the impersonal one cannot. In other words, the impersonal construction can't help but express necessity in light of the speaker's priorities, rendering it unacceptable in this context.

Summing up, out of the four syntax-flavor combinations that are in principle possible, we find that only two are available to *kailangan*. Gray cells in Table 2 represent unattested syntax-flavor combinations. In the next subsection, we make the same generalization about English *need*.

### 3.2 English *need*

Like *kailangan*, English *need* enters two syntactic structures. The expletive subject in (16) indicates that *need* is in a raising structure, lacking a thematic relation to the preverbal subject (Harves 2008). In contrast, (17) must involve a thematic relation between *need* and *John*, assuming that all DPs receive a theta-role (Chomsky 1981); the embedded predicate's single theta-role is discharged onto *food*.

- (16) There needs [<sub>TP</sub> to be food left over]. *Impersonal*  
 (17) John needs [<sub>CP</sub> there to be food left over]. *Thematic*

A combination of complement clause and subject animacy can be used to differentiate between impersonal and thematic constructions in English. In particular, the combination of an unambiguously thematic construction (i.e., a fully saturated CP-complement) and an inanimate subject results in unacceptability, as shown in (19). Given that (18), where a TP-complement is paired with an inanimate subject, is acceptable, we conclude that it must have an impersonal parse, which does not involve a thematic dependency between *the stew* and *need*.

- (18) The stew needs [<sub>TP</sub> to be tasted by the chef]. *✓ Impersonal*  
 (19) \* The stew needs [<sub>CP</sub> the chef to taste it]. *\*Thematic*

In general, we conclude that if an example with an inanimate subject is acceptable, it is an impersonal construction. Note that when *need* has an animate subject and an infinitival complement as in (20), both a raising parse and a control parse are available, given the structural ambiguity between these constructions in English.

- (20) John needs to leave.  
     a. John needs [<sub>TP</sub> ~~John~~ to leave] *Raising*  
     b. John needs [<sub>CP</sub> PRO to leave] *Control*

Having established that English *need*, like Tagalog *kailangan*, enters two syntactic structures, we determine which of the four possible syntax-flavor combinations are attested. As before, we present minimal pairs consisting of thematic and impersonal constructions in contexts that make salient a tension between the speaker's and the thematic subject's priorities. We repeat Context 1 from the preceding subsection with examples (21) and (22). Given its fully-saturated complement clause, (22) must be a thematic construction, involving a dependency between *John* and *need*. In contrast, the form of (21) does not rule out a raising parse.

**Context preceding statement of purely speaker-oriented necessity**

*Context 1: John is hungry. His mother gave him a plate of food, and although she knows he intends to eat it all, she told him to set some food aside for his brother. She tells her friend...*

- (21) John needs to leave some food for his brother. ✓ *Impersonal*  
(22) # John needs there to be food left for his brother. # *Thematic*

The minimal pair in (21-22) reveals that (21), which can be parsed as impersonal, can be used to express necessity in light of priorities that only the speaker holds, while the unambiguously thematic construction cannot.

Finally, we present Context 3 with examples (23-24). (23) can only be raising, given its well-formedness in spite of *need*'s incompatibility with inanimate thematic subjects. (24) can only be control since *need* is followed by a fully saturated clause.

**Context preceding statement of purely subject-oriented necessity**

*A social justice professor is discussing superstitious practices in an ancient civilization that she condemns. The civilization would perform sacrifices every spring to ensure prosperity. The professor describes these practices to students saying...*

- (23) # A sacrifice needed to be performed by the ancients every spring. # *Impersonal*  
(24) The ancients needed a sacrifice to be performed every spring. ✓ *Thematic*

The speaker's priorities in this context include that human sacrifices are not performed (or at least that her students learn that sacrifices are bad); the subject's priorities include that their gods are appeased. As in Tagalog, the thematic construction in (24) can be used to express necessities in light of priorities that only the subject holds, while the impersonal construction cannot. In other words, (23) can't help but express necessity in light of the speaker's priorities, rendering it unacceptable.

**3.3 Summary**

We find that syntax imposes a constraint on the flavor of necessity that Tagalog *kailangan* and English *need* can express. Our generalization is repeated in (25).

(25) **Syntax-flavor mapping generalization**

Impersonal constructions express speaker-oriented necessities but not purely subject-oriented necessities; thematic constructions express subject-oriented necessities but not purely speaker-oriented necessities.

This generalization is what our proposal in the next section aims to capture.

## 4 Proposal

*Kailangan* and *need* exhibit a correlation between the thematic relations they establish and the flavor of necessity they express. As shown in the preceding section, unambiguously thematic constructions express necessity in light of priorities belonging to the thematic subject, and unambiguously impersonal constructions express necessity in light of priorities endorsed by the speaker. In this section, we present our analysis of this correlation, which is developed within Kratzer's (1981, 1991) framework for the analysis of context-sensitive natural language modals. We propose that NEED always selects a thematic needer argument and expresses necessity in view of a presupposed desire of this needer. In thematic constructions, the overt thematic argument satisfies the needer role; in impersonal constructions, an implicit pronoun that refers to the speaker satisfies this role.

Our proposal for impersonal constructions is inspired by analyses of impersonal uses of experiencer predicates e.g., predicates of personal taste like *tasty* and *fun* (cf. Lasersohn 2005; Stephenson 2007; Pearson 2013a). In particular, we adopt a version of Pearson's (2013a) proposal for how to capture the default speaker-orientation of an 'impersonal' taste statement like (26a), which lacks an overt experiencer argument as found in (26b).

- (26) a. That brand of cereal is tasty.  
       ↪ Speaker has tasted that brand of cereal
- b. That brand of cereal is tasty to Sue.  
       ↯ Speaker has tasted that brand of cereal

Pearson 2013a proposes that impersonal taste statements involve an implicit variable pronoun, bound by various operators in different constructions. We capture the speaker-orientation of impersonal NEED statements by analyzing them as having an implicit pronoun that is bound by an assert operator in declarative main clauses.<sup>4</sup>

In the following subsections, we summarize our assumptions about the truth conditions of modalized statements and about grammatical distinctions among different modal verbs. Then, we give our proposal for the denotation of NEED and show how we can derive the syntax-flavor mapping described in the previous section, once we have an understanding of the syntax of the two construction types.

<sup>4</sup> Pearson's analysis also explains the 'generic inference': the inference that (26a) is about the tastes of a larger group of people than just the speaker. While we believe parallel inferences are licensed with impersonal NEED statements, we do not provide empirical support for their existence here, nor do we present the aspects of Pearson's (2013a, 2013b) proposal that would explain them. We observe that the modality literature discusses what we call generic inferences primarily in connection with epistemic modality (e.g., von Stechow & Gillies 2008).

#### 4.1 Kratzer 1981, 1991

We assume that necessity modal verbs are context-sensitive universal quantifiers over possible worlds; they say that every world in some subset of the logical space has the property denoted by the modal verb's syntactic complement (i.e., the 'prejacent'). Following Kratzer 1981, 1991, we assume that two contextually-supplied parameters called *conversational backgrounds* pick out the relevant subset of the logical space: these are the *modal base function*, which maps possible worlds to sets of facts that obtain in those worlds (type  $\langle s, \langle st, t \rangle \rangle$ ), and the *ordering source function*, which maps possible worlds to sets of ideals represented in those worlds (also  $\langle s, \langle st, t \rangle \rangle$ ). Modal verbs quantify over those worlds that realize all the facts returned by the modal base function and that satisfy the ideals returned by the ordering source function better than any other world that also realizes the relevant facts. We refer to this set as the BEST worlds, defined in (27) (cf. von Stechow 1999 on MAX); the definition relies on the method of imposing a strict partial order on worlds using a set of propositions, shown in (28) (Kratzer 1981).<sup>5</sup>

- (27) For any world  $w$ , modal base function  $f$ , and ordering source function  $g$ :  
 $\text{BEST}(f, g, w) = \{w' : w' \in \bigcap f(w) \ \& \ \neg \exists w'' [w'' \in \bigcap f(w) \ \& \ w'' \triangleleft_{g(w)} w']\}$
- (28) For any worlds  $w', w''$  and set of propositions  $A$ :  
 $w'' \triangleleft_A w'$  iff  $\{p_{st} : p \in A \ \& \ p(w')\} \subset \{q_{st} : q \in A \ \& \ q(w'')\}$

Assuming that modal base and ordering source functions are coordinates of a contextual parameter of evaluation, we assign modal auxiliaries like *must* and *have-to* the denotation in (29).

- (29)  $\llbracket \text{must/have-to} \rrbracket^C(w_s)(p_{st}) = 1$  iff  $\text{BEST}(f^C, g^C, w) \subseteq p$

#### 4.2 Presuppositional modals

As observed by Rubinstein's (2012: §3.2.2), certain necessity modals impose restrictions on what kinds of ideals can form the basis of the necessities they express. *Necessary*, when complemented by a *for-to* infinitive, is one such modal; in Rubinstein's terms, it can only express goal-oriented, teleological modality. This is illustrated by the contrast between *have-to* and *necessary* in (30) (based on Rubinstein's (109)). Of the two, only *have-to* can express the kind of pure circumstantial necessity appropriate for a statement about someone's medical condition; the use of *necessary* implies that a goal is achieved by Bill's sneezing.

- (30) a. Whenever Bill looks directly at the sun, he *has to* sneeze.

<sup>5</sup> Unlike Kratzer 1981, we make what Lewis 1973 calls the 'Limit Assumption' – essentially, the assumption that the set of BEST worlds is always non-empty.

- b. ? Whenever Bill looks directly at the sun, it's *necessary* for him to sneeze.

Rubinstein (2012) proposes that whereas *must* and *have-to* quantify over the worlds that rank best according to whatever ideals are contextually represented, *necessary* quantifies over the worlds that rank best according to a new priority or goal introduced by the predicate's own presupposition. A simplified version of *necessary*, which is the basis of our analysis of NEED, is in (31); it does not reflect Rubinstein's proposal for the difference between strong and weak necessity modals.

- (31)  $\llbracket \textit{necessary} \rrbracket^C(w_s)(p_{st})$  is defined only if  $\exists q_{st} [q$  is a goal of a salient individual in  $w$  &  $g^C(w) = \{q\}$ ].  
If defined,  $\llbracket \textit{necessary} \rrbracket^C(w_s)(p_{st}) = 1$  iff  $\text{BEST}(f^C, g^C, w) \subseteq p$

### 4.3 NEED

We propose that NEED, like *necessary*, imposes a revision on the contextually-supplied ordering source function. Specifically, it requires the value of the ordering source in the evaluation world to be a set containing a desire of the needer argument. In this way, the thematic relations that NEED establishes in the thematic and impersonal constructions can affect the flavor of modality that the verb is able to express. Additionally, we assume that NEED's prejacent and its negation must both be compatible with the modal base, as assumed for *want* (cf. Heim 1992, von Stechow 1999). Our denotation for NEED is given in (32).

- (32)  $\llbracket \text{NEED} \rrbracket^C(w_s)(p_{st})(x_e)$  is defined only if  
a.  $\exists q_{st} [q$  is a desire of  $x$  in  $w$  &  $g^C(w) = \{q\}$ ]  
b.  $\cap f^C(w) \cap p \neq \emptyset$   
c.  $\cap f^C(w) - p \neq \emptyset$   
If defined,  $\llbracket \text{NEED} \rrbracket^C(w_s)(p_{st})(x_e) = 1$  iff  $\text{BEST}(f^C, g^C, w) \subseteq p$

Because NEED can only express necessities in light of what the individual argument takes to be desirable, the identity of the needer argument, as determined by the syntactic structure, plays an important role in determining modal flavor. In the following two subsections, we show how this denotation, paired with a proposal for the syntax of thematic and impersonal constructions, explains the contrasts observed earlier in the types of necessity the two constructions can express.

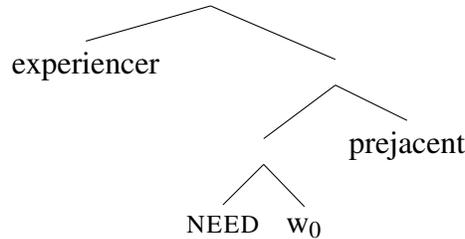
### 4.4 Accounting for the mapping: Thematic constructions

We assume that in Tagalog and English thematic constructions, the individual argument of NEED is the overt DP subject, which is base-generated in the matrix clause

as an experiencer. The schema for thematic constructions in both languages is given in (33)<sup>6</sup>, where ‘experiencer’ represents GEN-marked subjects in Tagalog and ECM or control subjects in English.<sup>7</sup>

**LFs of thematic constructions**

(33)



Given our denotation for NEED, thematic constructions express necessities in light of a desire of the overt experiencer. This can explain why the Tagalog thematic construction in (13), repeated below in (34), is rejected in the provided context; its interpretation on our analysis is given in (35).

**Context preceding statement of purely speaker-oriented necessity**

*Context 1: Juan is hungry. His mother gave him a plate of food, and although she knows he intends to eat it all, she told him to set some food aside for his brother. She tells her friend...*

(34) # kailangan ni-Jua-ng mag-tira ng-pagkain.  
 NEED GEN-Juan-COMP AV-set.aside OBJ-food  
 ‘Juan feels a need to set aside food’

(35)  $\llbracket(34)\rrbracket^C$  is defined only if  
 a.  $\exists q_{st} [q \text{ is a desire of Juan in } @ \ \& \ g^C(@) = \{q\}]$   
 b.  $\cap f^C(@) \cap \{w' : \text{Juan sets aside food in } w'\} \neq \emptyset$   
 c.  $\cap f^C(@) - \{w' : \text{Juan sets aside food in } w'\} \neq \emptyset$   
 If defined,  $\llbracket(34)\rrbracket^C = 1$  iff  $\text{BEST}(f^C, g^C, @) \subseteq \{w' : \text{Juan sets aside food in } w'\}$

6 We adopt Heim & Kratzer’s (1998) notation for binding indices, which are interpreted as lambda-abstractors over coindexed variables by the rule of Predicate Abstraction. Additionally, we assume that world-indices and binders are represented at LF, following Percus 2000. A free occurrence of  $w_0$  denotes the actual world, @.

7 Either controlled PRO or a distinct subject may appear in the embedded clause, which denotes NEED’s prejacent; we abstract away from control relations here and treat NEED’s prejacent as a proposition rather than e.g., a set of centered worlds.

In prose, (34) presupposes that Juan desires something and asserts that what Juan desires necessitates that he set aside food; but, the context indicates that the speaker knows that Juan has no desire that is realized only by setting aside food (given that she knows he intends to eat all the food). Hence, it would be odd for her to say this. The same explanation can be given for the unacceptability of the English sentence *John needs there to be food left for his brother* in this context (see (22) above).

Our proposal also explains why inanimate subjects cannot appear in thematic constructions; such constructions presuppose that the experiencer desires something, and inanimate subjects have no desires in the relevant sense, thereby inducing presupposition failures.

#### 4.5 Accounting for the mapping: Impersonal constructions

Following Pearson 2013a,b, we propose that impersonal NEED constructions, like other impersonal experiencer constructions, involve an implicit bound variable in the position of the experiencer argument. This variable is bound by an abstraction index in the left periphery of the clause, and depending on the operator that takes the abstracted-predicate as its argument, a different value is assigned to the experiencer argument. For main-clause declarative utterances, we assume that an implicit ASSERT operator determines that the experiencer is the speaker.

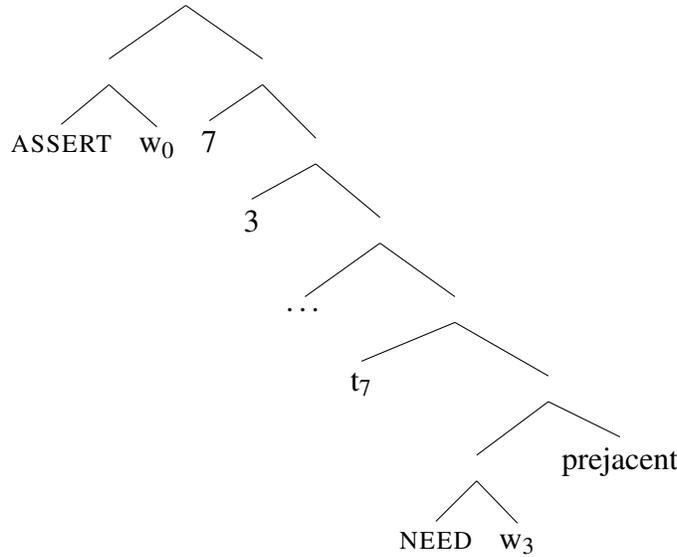
Our schema for impersonal NEED constructions is given in (36), and our version of an ASSERT operator is given in (37); it applies the property denoted by the sentence to the speaker and the actual world.<sup>8</sup>

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<sup>8</sup> Positing such operators in the logical form of sentences is controversial (Lauer 2015), but their utility has been shown by their application in the analysis of many different linguistic phenomena (e.g., Krifka 2001 on questions with quantifiers; Sauerland & Yatsushiro 2015 on speech act-modification readings of *again*, among many others).

**LFs of impersonal constructions**

(36)



(37)  $\llbracket \text{ASSERT} \rrbracket^C(w_s)(P_{\langle e, \langle st \rangle \rangle}) = 1$  iff  $P(\text{Speaker}^C)(w)$

With our version of the ASSERT operator, a declarative sentence is true just in case it denotes a property that holds of the speaker in the actual world. With this view of the LF of impersonal constructions, we can explain why (23), repeated in (38) is rejected in its context; its interpretation on our analysis is given in (39).

**Context preceding statement of purely subject-oriented necessity**

*A social justice professor is discussing superstitious practices in an ancient civilization that she condemns. The civilization would perform sacrifices every spring to ensure prosperity. The professor describes these practices to students saying...*

(38) # A sacrifice needed to be performed by the ancients every spring.

(39)  $\llbracket (38) \rrbracket^C$  is defined only if

- a.  $\exists q_{st} [q \text{ is a desire of } \text{Speaker}^C \text{ in } @ \ \& \ g^C(@) = \{q\}]$
- b.  $\cap f^C(@) \cap \{w' : \text{a sacrifice is performed by the ancients in } w'\} \neq \emptyset$
- c.  $\cap f^C(@) - \{w' : \text{a sacrifice is performed by the ancients in } w'\} \neq \emptyset$

If defined,  $\llbracket (39) \rrbracket^C = 1$  iff

$\text{BEST}(f^C, g^C, @) \subseteq \{w' : \text{a sacrifice is performed by the ancients in } w'\}$

In prose, (39) presupposes that the speaker desires something and asserts that what the speaker desires necessitates that a human sacrifice was performed by

the ancients. The context doesn't make salient any desire of the speaker's that necessitates that a sacrifice was performed; indeed, the context indicates that the salient priorities that do necessitate that a sacrifice was performed are not shared by the speaker, since she considers them to be based in superstition. Hence, it would be odd for her to say this.

A similar explanation can be given for the unacceptability of the Tagalog impersonal construction in (14), repeated below in (40).

### **Context preceding statement of purely subject-oriented necessity**

*Context 2: Juan has always smoked, but now he's sick. The doctor ordered him to quit, but Juan cannot resist, and he told his doctor that he will not quit. The doctor says to Juan's wife...*

- (40) # kailanga-ng ma-nigarilyo si-Juan.  
       NEED-COMP AV-smoke SUBJ-Juan  
       'It is required that Juan smoke'

Although a desire of the subject's is made salient that necessitates that he smoke, no desire of the speaker's (i.e., the doctor's) is, and real-world knowledge makes it implausible for a doctor to have such a desire.

Before closing this section, we clarify a few points about our proposal. Our assumption that the ASSERT operator is found in the left-periphery of matrix declarative clauses is not incompatible with the fact that some sentences (including thematic constructions under our analysis) do not contain implicit variable arguments to be bound. Such sentences can also be analyzed as denoting properties that the speaker self-ascribes (see Pearson 2013a: 132ff, citing Lewis 1979, on 'self-locating content'). More generally, although we adopted Pearson's analysis of experiencer predicates to explain the syntax-flavor mapping we identified with NEED, we believe that our analysis can be recast with a different view on how experiencer predicates come to be speaker-oriented when no experiencer is overtly expressed. Our main insight is that the syntax-flavor mapping we described for NEED has a well-documented parallel in other experiencer predicates.

## **4.6 Summary of proposal**

To explain the syntax-flavor mapping exhibited by NEED in Tagalog and English, we proposed a single lexical entry for the modal verb, which comes with predetermined flavor (implemented using Rubinstein's (2012: §3.2.2) presuppositional approach). We proposed that NEED always expresses necessity in light of priorities belonging to its experiencer argument; this allows for the value of NEED's experiencer argument to categorically determine what type of necessity the verb expresses. We proposed

that the referent of the experiencer is what distinguishes impersonal and thematic constructions. Thematic constructions express necessity in light of priorities belonging to the overt needer argument, while impersonal constructions express necessity in light of priorities belonging to the implicit variable argument, which is speaker-bound in matrix clauses. Our proposal for impersonal constructions is based on an analysis for a larger class of predicates, namely experiencer predicates like *tasty* and *fun* (Pearson 2013a,b).

## 5 Open questions

### 5.1 Modal anchors

We briefly discuss how our proposal relates to a broader theory of how modals acquire flavor, originating in the work of Hacquard (2006, 2010). According to this approach, modals acquire their domain of quantification from the elements that they establish syntactic dependencies with i.e., their ‘modal anchors’. A simplified version of this approach says that a modal quantifies over worlds that have matches or counterparts of its anchor argument (Arregui 2005 et seq.). Hacquard’s work on functional modals illustrates how dependencies on different syntactically-represented event arguments can explain correlations between modal flavor and syntactic height.

Although our proposal employs different theoretical tools (e.g., a rather specific method of fixing modal flavor via presupposition), it has in common the idea that a single lexical entry for a modal, embedded in different syntactic structures, can result in different flavors of modality. We emphasize the significance of thematic relations for fixing a domain of quantification and observe a parallel with an example from Kratzer 2013 (citing Lewis 1997), simplified here. In many cases, the statements in (41-42) can be seen as synonymous, expressing, roughly, that in some accessible world where the glass has the same make-up that it has in the actual world, it breaks.

(41) This glass can break easily.

(42) This glass is fragile.

They come apart, however, if used to describe a glass made of fragile crystal that’s sitting on a shelf above a net; the net is insignificant in determining whether the glass is *fragile*, but it affects the judgement about whether the glass *can break easily*. According to Kratzer 2013, this is due to the fact that *fragile* establishes a thematic dependency with *this glass* and therefore quantifies over worlds that have counterparts of the glass; in contrast, *can break* is a raising predicate that establishes a thematic dependency with a more abstract situation argument, which potentially includes the net, and quantifies over worlds that have counterparts of the whole

situation. It's less clear that there are worlds with matches of the full situation (including the net) where the glass breaks.

### 5.2 Differences among lexical modals

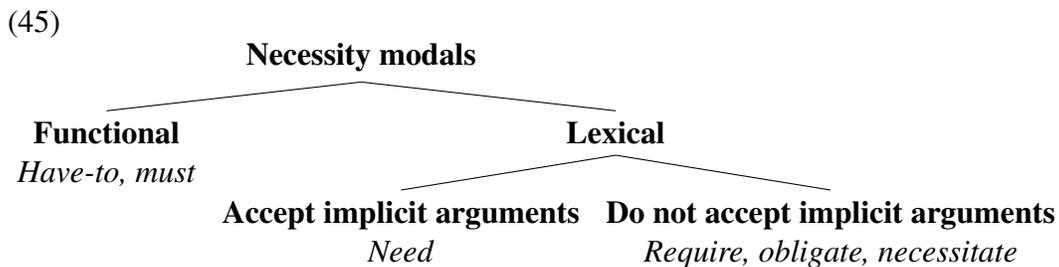
In future work, we intend to examine the grammatical properties of other lexical modals. We discovered that NEED can express necessities in light of the speaker's or the subject's priorities, depending on the structure it's in. Do all lexical modals exhibit similar syntax-flavor correspondence? Comparing *need* with the superficially similar *require*, we find that they do not. *Require* also enters unambiguously thematic constructions, as in (43), but unlike *need*, it lacks an impersonal variant, illustrated in (44) by its incompatibility with expletive subjects.

(43) John {needs, requires} [<sub>CP</sub> there to be food left for his brother.]

(44) There {needs, \*requires} [<sub>TP</sub> to be food left for John's brother.]

Given that *require* lacks an impersonal constructions, it's unsurprising that it does not express speaker-oriented necessities. We hypothesize that having an impersonal construction and expressing speaker-oriented necessity correlates with being an experiencer predicate. Consequently, we predict that *require* and other agentive lexical modals like *obligate* and *necessitate* should not allow impersonal constructions, expressing speaker-oriented necessities.

(45) shows a tentative, more articulated typology of necessity modals as follows from our discussion. The basis for the split among lexical modals requires clarification.



### 6 Conclusion

In this paper, we argued that certain contrasts in modal flavor exhibited by the modal NEED are grammatically conditioned. NEED uniformly expresses necessities in light of its needer argument's priorities, but syntax determines what this argument can be. Our analysis drew a connection between NEED-type modals and other experiencer predicates like *tasty*. Our analysis leads to a new typology of lexical modals, dividing them according to whether they accept implicit experiencer arguments and thereby express speaker-oriented necessities.

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