

# A corpus-based study of Gitksan modals<sup>1</sup>

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## 1 Introduction

In this paper I test the predictions of previous analyses of Gitksan (Tsimshianic) modals on a corpus of 36 Gitksan stories. See Reisinger et al. (2022) for a similar (but more in-depth) corpus-based study on modals in English and St'át'imcets (Lillooet Salish).

Section 2 gives some necessary theoretical background. Section 3 describes the methodology of the study and introduces the four modals to be investigated. Sections 4 to 7 summarize the findings for each modal, and Section 8 concludes.

## 2 Theoretical background

Modals are standardly analyzed as quantifiers over possible worlds (Kratzer 1991). I will be investigating two core properties of modals: their modal force, and their modal flavour. *Modal force* refers to the quantificational strength of the modal. Example (1) presents some English modals that lexically encode differing modal forces, from strongest in (1a) to weakest in (1c).

- (1) a. NECESSITY:  
Zoe **must** meet with her thesis supervisor.
- b. WEAK NECESSITY:  
Zoe **should** meet with her thesis supervisor.

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<sup>1</sup> This paper is inspired by, and follows on from, collaborative work with Hotze Rullmann (Rullmann et al. 2008; Rullmann and Matthewson 2018; Reisinger et al. 2022). Hotze has been a great colleague, research collaborator, mutual supervisor of students, and friend for nearly 20 years so far. Much of what I have done in my career, I couldn't have done without Hotze, and I am very grateful.

Many thanks to Gitksan speakers Vincent Gogag, Hector Hill, and Barbara Sennott for their beautiful stories and for their work over many years documenting their language. *Ha'miyyaa!* Many thanks to the members of the Gitksan Research Lab who have contributed to the Forbes et al. (in prep.) volume — especially Clarissa Forbes, Michael Schwan, and Henry Davis, and many others over the years. Thanks also to Henry Davis and Clarissa Forbes for commenting on a draft of this paper.

- c. POSSIBILITY:  
 Zoe **may** meet with her thesis supervisor.

*Modal flavour* refers to the type of modal reasoning that is involved; the different flavours result from restrictions on the sets of possible worlds that are quantified over (Kratzer 1991). Some flavours are illustrated for English in (2). Note that most or all non-epistemic flavours are sub-types of circumstantial modality. Thus, pure circumstantial, deontic, and ability flavours can all be grouped under circumstantial modality. This will become relevant below when we see the lexical distinctions that Gitksan modals make.

- (2) a. EPISTEMIC:  
 Zoe **might** be in her office (her office door is open).
- b. PURE CIRCUMSTANTIAL:  
 Roses **might** grow here (the soil and climate are right).<sup>2</sup>
- c. DEONTIC:  
 Zoe **should** be in her office (according to the rules).
- d. ABILITY:  
 Zoe **can** lift 50 kilos.

Languages differ in whether they tend to lexically encode modal force or modal flavour (or both, or neither). As seen in (1), English often lexically distinguishes modal force, and as seen in (2), English often does not lexically distinguish modal flavour. For example, the single lexical item *might* can be interpreted either epistemically or circumstantially.

Another important facet of modality is modal-temporal interactions (Condoravdi 2002). For space reasons, I focus here on only one aspect of these interactions, namely temporal orientation. This refers to whether the postulated event takes place before, simultaneously with, or after the time at which the modal is evaluated. These options are illustrated for English in (3). In all these examples, the modal is evaluated at the utterance time (i.e., based on utterance time knowledge). The postulated event either precedes, coincides with, or follows the utterance time (UT).

- (3) a. PAST TEMPORAL ORIENTATION:  
 Zoe must have arrived by now. (arrive < UT)

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<sup>2</sup> Example adapted from Kratzer (1991:646).

- b. PRESENT TEMPORAL ORIENTATION:  
Zoe might be arriving now. (arrive = UT)
- c. FUTURE TEMPORAL ORIENTATION:  
Zoe might arrive soon. (UT < arrive)

### 3 The study

The corpus for this study is Forbes et al. (in prep.), a volume of 36 stories told by three Gitksan speakers. The speakers are Vincent Gogag, from Git-anyaaw (Gitanyow), Hector Hill, from Gijigyukwhla (Gitsegukla), and Barbara Sennott, from Ansbayaxw (Kispiox). The corpus contains a little over 12,500 Gitksan words, and the stories have been translated into English and fully morpheme-glossed. Each line was translated into English by the storyteller, so we have the original speaker’s English rendition of all the sentences.

The modals to be tested are listed in Table 1, with prior proposals about their flavour and force. The two modals classified as ‘circumstantial’ allow all circumstantial sub-flavours, including pure circumstantial, deontic, and ability. The epistemic modal *ima'(a)* is analyzed by Peterson (2010) as also conveying an evidential restriction; the speaker must have inferential evidence for the prejacent proposition. The only modal omitted from this study is *gat*, the reportative evidential (Peterson 2010; Matthewson 2013). This is for space reasons and also because there were only 14 tokens of *gat* in the corpus, all from one speaker and almost all from a single story.

**Table 1:** Gitksan modals

MODAL	FLAVOUR	FORCE	REFERENCES
<i>sgi</i>	circumstantial	(weak) necessity	Rigsby (1986); Matthewson (2013)
<i>da'akhlxw</i>	circumstantial	possibility	Rigsby (1986); Matthewson (2013)
<i>anook</i>	deontic	possibility	Rigsby (1986); Matthewson (2013)
<i>ima'(a)</i> <sup>3</sup>	epistemic	variable force	Peterson (2010, 2012); Matthewson (2013)

<sup>3</sup> This modal is pronounced as *imaa*, *ima'*, or *ima'a*, depending on the speaker and possibly on speech rate.

Regarding temporal orientation, Matthewson (2012, 2013) has argued that future orientation is always overtly spelled out in Gitksan via the prospective aspect marker *dim*, while past and present temporal orientation are not overtly encoded (see also Matthewson & Todorović 2018; Rullmann & Matthewson 2018). This predicts that the epistemic modal *ima('a)* will co-occur with *dim* when — and only when — the temporal orientation is future. It further predicts that all the circumstantial modals (*sgi*, *da'akhlxw*, and *anook*) will always co-occur with *dim*, since circumstantial modals are by their very nature future-oriented (see Condoravdi 2002; Werner 2006; however, see Thomas 2014 for the proposal that this only holds for pure circumstantials).

All instances of all the modals were identified by searching for them by gloss. This resulted in a total of 19 tokens of *sgi*, 34 tokens of *da'akhlxw*, 26 tokens of *anook*, and 32 tokens of *ima('a)*. The sentences the modals appeared in were inspected for their meaning, using both the translation into English and the surrounding context. Each token was coded using the categories in Table 2.

**Table 2:** Categories used in the annotation process

Categories	Annotation options
flavour	epistemic   pure circumstantial   deontic   ability   undetermined
force	necessity   weak necessity   possibility   undetermined
temporal orientation	past   present   future   undetermined

In the following sections I present the findings. This is not a statistical study; only qualitative comments plus some raw numbers will be presented.

#### 4 *Sgi*

According to prior research, *sgi* should appear with exclusively circumstantial flavours; Matthewson (2013) establishes its use with pure circumstantial, deontic, and teleological flavours, and notes that one of the most common flavours of *sgi* is deontic (2013:380).<sup>4</sup> Matthewson

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<sup>4</sup> Matthewson (2013:382–383) observes one gap: *sgi* does not allow strong necessity pure

further argues that *sgi* has either weak or strong necessity force, and that it should always appear with *dim* in its preadjacent, due to its exclusively circumstantial flavours.

All 19 tokens of *sgi* in the corpus seem to have deontic flavour. An example is given in (4).<sup>5,6</sup>

- (4) **Sgi**            dim=t            luu    yuxw-diit=hl            ayook.  
**CIRC.NEC** PROSP=3.I in    follow-3PL.II=CN    law  
 ‘They should follow the laws.’  
 (Barbara Sennott, Dihlxw / The boat, line 23)

With respect to modal force, all the tokens seem to have some kind of necessity interpretation. Given that they are all deontic, this means that all tokens of *sgi* convey obligation. However, for most of the tokens it is not possible to tell (either from the contexts or from the English translations) whether *sgi* is interpreted as strong necessity or weak necessity. *Sgi* is variously translated into English using *should*, *supposed to*, *shall*, or with a form of the verb *be* plus an infinitive, as seen in example (5).

- (5) Dim ii    **sgi**=n            dip    hlimoo[-t]=hl    get,    walk'a  
 PROSP CCNJ **CIRC.NEC**=1.I 1PL.I help[-3.II]=CN    people    all  
           'ni=hl    get.  
           3.III=CN    people  
 ‘And we are to help the people, all the people.’  
 (Hector Hill, Hlaa yukw dim 'nu'whl get /  
 Before the people die, line 75)

circumstantial interpretations (cases like ‘I have to sneeze’). These contexts surface with prospective *dim* on its own, or with *'nim* ‘want’. See related discussion around examples (6) and (7) below.

<sup>5</sup> All data cited in this paper come from Forbes et al. (in prep.). Because the page numbers will change as the volume is finalized for publication, I cite the data with the speaker’s name, the name of the story, and the line number.

<sup>6</sup> Glosses follow the Leipzig Glossing Rules where possible. Additional glosses: I,II,III = Series I,II,III pronouns; ASSOC = associative; ATTR = attributive; AX = agent extraction; CAUS1 = causative 1 (prefix); CAUS2 = causative 2 (suffix); CCNJ = clausal conjunction; CIRC = circumstantial; CN = common noun connective; DEON = deontic; DETR = detransitive; DWID = domain widener; EPIS = epistemic; INTJ = interjection; MANR = manner; NEC = necessity; PCNJ = phrasal conjunction; POSS = possibility; PROSP = prospective; QUOT = quotative; SPT = spatiotemporal; SX = intransitive subject extraction; T = T-morpheme; VAL = valency adjuster; VER = verum. Square brackets [ ] indicate that a morpheme or phoneme is grammatically present, but not pronounced.

The prediction that *sgi* will always co-occur with *dim* is supported insofar as 18 of the 19 *sgi* tokens have *dim* on the modal's preadjacent. The only exception is the sentence in (5).<sup>7</sup>

Sometimes deontic modality is conveyed in the English translation, but in Gitksan only the prospective *dim* is used; examples of this are given in (6) and (7).

- (6) 'Ni[t]=gan wil[-t]=hl wen-i'm di-ye dip  
 3.III=reason be/do[-3.II]=CN sit.PL-1PL.II 3.I=QUOT ASSOC  
 nibib-i'y, **dim**=in dip hlimoo-dit 'nuu'm, **dim**  
 uncle-1SG.II **PROSP**=1.I 1PL.I help-3PL.II 1PL.III **PROSP**  
 hehle'lsd-i'm loo-dit.  
 work-1PL.II OBL-3PL.II  
 'That's why my uncle says, he says we are to help them, we are to  
 work for them.'

(Hector Hill, Hlaa yukw dim 'nu'whl get /  
 Before the people die, line 83)

- (7) K'ap=hl gabi=hl ayook **dim** luu yuxw[-i]-diit.  
 ten=CN how.many=CN law **PROSP** in follow[-TR]-3PL.II  
 'There are ten laws that they should follow.'  
 (Barbara Sennott, Dihlxw / The boat, line 11)

Matthewson et al. (2022) argue that when *dim* appears without a modal, there is a phonologically null modal in the structure above *dim*. This allows us to maintain a unified analysis of *dim* as providing only temporal ordering. Thus, *dim* always serves to provide the future orientation for some modal element. The analysis accounts for (6) and (7), but future research is required to establish whether there are force and flavour constraints on the null modal.

## 5 *Da'akhlxw*

*Da'akhlxw* has been argued to be a general circumstantial possibility

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<sup>7</sup> Clarissa Forbes (p.c.) suggests that the sentence-initial *dim* in (5) may have started out following *sgi*, in the position where we expect it to appear, and moved to the front. Forbes notes that the presence of the 1st person plural pronoun *dip* could somehow be responsible, as *dim* has been noticed in an unexpected sentence-initial position in other constructions with *dip*. Further research is required.



- (10) “Nee=m **da'akhlxw**[-t] dim=a mehli[-t]=hl wila  
 NEG=2.I CIRC.POSS[-3.II] PROSP=2.I tell.T[-3.II]=CN MANR  
 wi[1][-t]=hl betl'-a betl' loo-'m=aa?”  
 be/do[-3.II]=CN plop-ATTR plop OBL-1PL.II=Q  
 “‘Will you tell us the story about *betl'a betl'*?’”<sup>9</sup>  
 (Hector Hill, *Betl'a betl'* / Story of a name, line 39)

Of the 34 tokens of *da'akhlxw* in the corpus, 28 of them straightforwardly co-occur with a following *dim*, as predicted; this can be seen in examples (8) to (10). In a further four cases, there is no *dim*, but this is because the prejacents is completely elided; an example of this is given in (11).

- (11) 'Nidiit[=hl] dim waatxw-it a[-t]=hl get ji  
 3PL.II[=CN] PROSP cry-SX PREP[-3.II]=CN person IRR  
 nee ji[=t] **da'akhlxw**-diit.  
 NEG IRR[=3.I] CIRC.POSS-3PL.II  
 ‘They are the ones to cry when the people that lost a person can’t  
 [cry].’  
 (Hector Hill, *Hlaa yukw dim 'nu'whl get* /  
 Before the people die, line 28)

The two remaining tokens that lack *dim* are given in (12) and (13). In (12), Clarissa Forbes observes (p.c.) that the material following *da'akhlxw* is not a clause, but a nominal (relative clause). *Da'akhlxw* here seems to have the meaning ‘manage to obtain (a thing)’, and may be a separate construction.

- (12) Iit dok[-t]=hl walk'a 'nit=hl gabii=hl  
 CCNJ=3.I take.PL[-3.II]=CN all 3.III=CN how.many=CN  
 dim hooy-i-t, dim wila=t **da'akhlxw**[-t]  
 PROSP use-TR-3.II PROSP MANR=3.I CIRC.POSS[-3.II]  
 siilinas-xw-t.  
 hunt-ANTIP-3.II  
 ‘And he gathered everything to use so he could catch what he’s  
 hunting.’  
 (Hector Hill, *Betl'a betl'* / Story of a name, line 6)

<sup>9</sup> *Betl'a betl'* is a rendition of the noise a grouse makes when it flies.

- (13) Ii=t      **da'akhlxw**-diit      ksi    sim-guu-t-diit.  
 CCNJ=3.I    CIRC.POSS-3PL.II    out    true-take-T-3PL.II  
 'They were able to wrestle it out of the water.'  
 (Vincent Gogag, Wilps Gu'nuu /  
 The House of Gu'nuu, line 14)

As seen in (11), *da'akhlxw* can scope under negation, with the meaning 'not able to' or 'not allowed to'. The corpus also revealed two monomorphemic forms to express inability: *hlguxws* (in Barbara Sennett's stories) and *gos* (in Hector Hill's stories). The difference, if any, between these forms and negated *da'akhlxw* could be followed up in future research.<sup>10</sup>

## 6 *Anook*

*Anook* has been analyzed as a deontic possibility modal; the prediction is therefore that it should be used exclusively to convey permission interpretations. It should obligatorily co-occur with *dim*.

The predictions are upheld with near perfection: all 26 tokens of *anook* in the corpus have permission interpretations, and 25 of the 26 tokens either co-occur with *dim* (22 tokens), or appear with a fully elided preadjacent (three tokens). Examples are given in (14) and (15), with and without an overt preadjacent, respectively.

- (14) Ii=t      **anook**[-t]=hl      sim'oogit    dim=t      'nii  
 CCNJ=3.I    DEON.POSS[-3.II]=CN    chief      PROSP=3.I    on  
           t'aa-d-it    goo=hl      lax    se'e-t.  
           sit-T-3.II    LOC[-3.II]=CN    on    leg-3.II  
 'And the chief allowed the stranger to have the baby sit on his lap.'  
 (Barbara Sennott, Ha'niisgats 'Wii Gat /  
 'Wii Gat's birth, line 20)

- (15) ... ii      da'akhlxw[-t]=hl      dim=m      sdil-i'm,  
 ... CCNJ    CIRC.POSS[-3.II]=CN    PROSP=2.I    accompany-1PL.II  
           ji=da=t      **anook**-diit      'niin."  
           IRR=SPT=3.I    DEON.POSS-3PL.II    2SG.III  
 '... and you can come with us, if they allow you to [come]."  
 (Hector Hill, T'aahl isi'm / Picking soapberries, line 25)

<sup>10</sup> Neither *hlguxws* nor *gos* are found in Rigsby (1986) or Hindle and Rigsby (1973). Tarpent (1987:485) mentions *gos* in Nisga'a and glosses it as 'can't do something'.

The one counter-example to the presence of *dim* with *anook* is given in (16). It is possible that this example is different because it has a negated preajcent, but further research is required.

- (16) *Ii=t anook-dii nee ho<sub>x</sub> dii yee-'y.*  
 CCNJ=3.I DEON.POSS-3PL.II NEG again FOC go-1SG.II  
 ‘And they allowed me not to go.’  
 (Hector Hill, Jayeehli'm / Our traps, line 66)

For completeness, I note that there are no tokens of *anook* in the corpus from Vincent Gogag. This is surely a coincidence (i.e., a result of the particular stories Vincent happened to tell here), as Matthewson (2013) provides multiple examples of *anook* collected from Vincent.

## 7 *Ima('a)*

Our final modal, epistemic *ima('a)*, provided the most surprising results.

The predictions for *ima('a)* are that it will have exclusively epistemic modal flavour, it will be compatible with any modal force, and its preajcent will contain *dim* when, and only when, the modal has future temporal orientation (i.e., when the hypothesized event takes place after the modal's temporal perspective).

There are 32 tokens of *ima('a)* in the corpus, and all of them seem to have epistemic modal flavour. An example is given in (17).

- (17) *Sib-in[-i-t]=hl sim'oogit=hl dilhxw. Sga*  
 hard-CAUS2[-TR-3.II]=CN chief=CN bag blocking.way  
*ts'iib-i-t=imaa.*  
 tie-TR-3.II=EPIS  
 ‘The chief tightened up the boat. Perhaps he tied it off.’  
 (Barbara Sennott, Dihlxw / The boat, line 49)

The other prediction that is straightforwardly upheld is the one about temporal orientation. The only three tokens where *dim* appears on *ima('a)*'s preajcent are cases of future temporal orientation, as illustrated in (18) (and also in (25) below):

- (18) Ligi 'negw=**ima'a** dim k'uhl wil-t.  
 DWID long=**EPIS** PROSP around be/do-3.II  
 “‘He may take a long time.’”  
 (Vincent Gogag, Sga'watxw liksgigedim get /  
 Adventures with strangers, line 22)

Modal force is difficult to determine for *ima('a)* in the corpus. Based on translation, approximately half the tokens can be classified with some confidence as having existential force (conveying possibility); (17) and (18) are examples of this, and (19) is another. Example (19) clearly involves a possibility interpretation, given the immediately preceding clause that expresses unsureness.

- (19) Nee dii=n wilaax[-t=hl] wila wil, ligi  
 NEG FOC=1.I know[-3.II=CN] MANR be/do DWID  
 sga hit'-in[i]-d=**imaa**.  
 blocking.way stick-CAUS2[-TR]-3.II=**EPIS**  
 ‘I don’t know how it is done, maybe sealed.’  
 (Barbara Sennott, Dihlxw / The boat, line 50)

No tokens of *ima('a)* are translated with strong necessity modals (*must* or *have to*). There is one that is translated with ‘probably’, and may therefore have a weak necessity interpretation:

- (20) Ii he-diiit loo-t k'ap am gilbil[=hl] wilaax[-i]-  
 CCNJ say-3PL.II OBL-3.II VER only two[=CN] know[-TR]-  
 diid=**ima'a** a[-t]=hl k'amksiwaa-mx-diiit.  
 3PL.II=**EPIS** PREP[-3.II]=CN white.people-language-3PL.II  
 ‘They said that they only knew probably two words in English.’  
 (Vincent Gogag, Sga'watxw liksgigedim get /  
 Adventures with strangers, line 12)

The remainder of the tokens of *ima('a)* receive a range of translations. Some are translated with expressions of vagueness like ‘kind of’ or ‘about’, as in (21); these make sense, since saying there were ‘about four’ is similar to saying there were ‘maybe four’.

- (21) *li sagayt t̥xalpx=uma'a=hl gabi-'m saa*  
 CCNJ together four=EPIS=CN how.many-1PL.II away/off  
*bax xba hlo'o-t lax sga'nist ....*  
 uphill mid go.PL-SX on mountain  
 ‘And there was about four of us that walked up the mountain ....’  
 (Hector Hill, Jayeehli'm / Our traps, line 35)

Another set of *ima('a)* tokens are translated with expressions like ‘I’m not sure’ or ‘I don’t know’, as in (22) and (23). Example (22) is literally ‘He might not come back’, and (23) is literally something like ‘It might be that many times that they took him around’.

- (22) *Ligi neey=ima'a dim dii gukws 'witxw-t,' d=iya.*  
 DWID NEG=EPIS PROSP FOC back arrive-3.II 3.I=QUOT  
 ‘‘‘We don’t know when he’ll be back.’’’  
 (Vincent Gogag, *Sga'watxw liksgigedim get /*  
*Adventures with strangers*, line 23)
- (23) *li day=imaa=hl gabii=t luu-tk'u di-yee-t.*  
 CCNJ SPT=EPIS=CN how.many=3.I in-circular COM-go-3.II  
 ‘And I’m not sure how many times they took him around.’  
 (Barbara Sennott, *Bitxw / Divorce*, line 8)

Something that had not been noticed in prior literature is the frequent use of *ima('a)* in the formation of ignorance free relatives, as illustrated in (24) and (25).

- (24) *gan=hl aaty-asxw gan=hl, gwiy=imaa=t*  
 PCNJ=CN feel-ANTIP PCNJ=CN what=EPIS=3.I  
*si-wad[-t]=ihl amxsiwaa.*  
 CAUS1-name.T[-3.II]=CN white.people  
 ‘and spiritual visions and, whatever the white people call it.’  
 (Barbara Sennott, *Gwiis gan'mala / Button blanket*, line 6)
- (25) *ii-t jap[-t]=hl gwiy=imaa dim hooy-i-t*  
 CCNJ=3.I make[-3.II]=CN what=EPIS PROSP use-TR-3.II  
*dim=t jagw[-t]=ihl lalt.*  
 PROSP=3.I kill.T[-3.II]=CN snake  
 ‘and he made whatever he was going to use to kill the snake.’  
 (Barbara Sennott, *Wii lalt | Big snake*, line 11)

Future research is needed to work out the compositional semantics of these structures. Some but not all analyses of ignorance free relatives invoke epistemic modality, so the presence of *ima('a)* has the potential to make an interesting contribution here.<sup>11</sup>

Occasional tokens of *ima('a)* are not translated at all, as in (26). This was also found in Reisinger et al.'s (2022) corpus-based study to be a feature of the St'át'imcets epistemic modal *k'a*.

- (26) T<sub>x</sub>alpx=**uma'a**[=hl] gabii=hl aloohl bisde'y[=hl] gukws  
 four=**EPIS**[=CN] how.many=CN INTJ grouse[=CN] back  
 da-'witxw-i[-t]=s nigwood-i'm.  
 COM-arrive-TR[-3.II]=PN father-1PL.II  
 'Dad brought back four grouse.'  
 (Hector Hill, Jayeehli'm / Our traps, line 60)

Finally, there are two cases where it is not obvious how to reconcile the speaker's English translation with the analysis of *ima('a)* as an epistemic modal. These are given in (27) and (28). In (27), there is a syntactic issue as well. According to Peterson (2010:70), "the most common surface position for =*ima* is as an enclitic to the first syntactic phrase in a clause." Peterson does note that there is some variability in the placement of *ima('a)*, but he does not give examples like (27), where the modal appears to attach to a sub-sentential constituent. The intended meaning seems to be that the speaker distances themselves from the name 'Indian Agent', but it is not immediately obvious how to derive this meaning from the extant analysis of *ima('a)* as an epistemic modal.

- (27) Way ii nee dii he[-t]=hl Indian Agent=**ima'a**,  
 so CCNJ NEG FOC say[-3.II]=CN Indian Agent=**EPIS**  
 si-wa-txws "Indian Agent", an=t  
 CAUS1-name-VAL Indian Agent AX=3.I  
 saayt-good-in[-t]=hl get,  
 together-all.gone-CAUS2[-3.II]=CN people  
 saayt-wen-dii.  
 together-sit.PL-3PL.II  
 'The Indian Agent disagreed, the so-called 'Indian Agent' who  
 gathered the people together for the meeting.'  
 (Vincent Gogag, Kitwancool reserve surveyed, line 15)

<sup>11</sup> See Šimík (2018) for a recent cross-linguistic discussion of free relatives, and references therein.

Example (28) is also interesting. Literally it seems to mean ‘It might have been recorded ...’, but it is translated as ‘It wasn’t recorded ...’.

- (28) Ligi t'imis=**ima'a**=hl k'uuhl luu-wen-diiit.  
 DWID write=**EPIS**=CN year in-sit.PL-3PL.II  
 ‘It wasn’t recorded how many years they were incarcerated.’  
 (Vincent Gogag, Kitwancool reserve surveyed, line 41)

I have nothing to suggest about this apparent translation mismatch, but the presence of the element *ligi* in this example is worth mentioning. *Ligi* is a mysterious element that has not yet been formally analyzed. It has a range of uses: it appears in some free relatives, in free choice contexts, in disjunctions, on polarity indefinites, in combination with another element *wihl* ‘like’ to convey indirect evidentiality, and by itself to convey either ‘maybe’ or a vagueness/‘about’ interpretation. It is noteworthy that over a third of the *ima'a* tokens in the corpus — 11 out of 32 — contain *ligi*. (Apart from example (28), examples (18), (19), and (22) above contain *ligi*.) This is different from the other modals investigated in this study, which *never* appear with *ligi* unless it is otherwise required inside the preadjacent of the modal. This seems to suggest that *ligi* is somehow related to epistemic modality. Further research is definitely required.

## 8 Concluding remarks

Corpus-based studies of modals can provide a useful follow-up to elicitation-based studies. This small corpus-based investigation largely confirmed the predictions of prior research that had been based on hypothesis-driven fieldwork. The present study also revealed some things that had not emerged from that prior work. The most important of these relate to the epistemic modal *ima'a*, which is used in the corpus in a wider range of contexts than was expected. The corpus investigation also made clear that we need to get a handle on the connection and interplay between *ima'a* and the mysterious element *ligi*. It had not even come to my attention in my prior work on *ima'a* that it so frequently appears with *ligi*; Peterson (2010) also does not mention *ligi* in his work on *ima'a*.

At the same time, a corpus-based study alone would also not have revealed the full landscape. For example, we know from elicitation that the circumstantial necessity modal *sgi* has non-deontic uses, but the

corpus contains only deontic uses of *sgi*. Thus, we again see confirmed the truism that applying multiple data-collection methods leads to a fuller and more robust empirical picture.

## References

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