

# Modals as Distributive Indefinites\*

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**Abstract:** Modals in St'át'imcets (Lillooet Salish) show two differences from their counterparts in English. First, they show variable quantificational force, systematically allowing both possibility and necessity interpretations; and second, they lexically restrict the conversational background, distinguishing between deontic and (several kinds of) epistemic modality. We provide an analysis of the St'át'imcets modals according to which they are akin to specific indefinites in the nominal domain. They introduce free choice function variables which select a subset of the accessible worlds. Following Klinedinst (2005), we assume distributivity over the resulting set of worlds. St'át'imcets modals thus receive a uniform interpretation as (distributive) pluralities. The appearance of variability in modal force arises because the choice function can select a larger or smaller subset of accessible worlds. Finally, we discuss the implications of our analysis for the status of evidentials as epistemic modals, and for the analysis of modals in languages such as English.

## 1. Introduction

### 1.1 Cross-linguistic differences in modal variability

The interpretation of modals is heavily dependent on context, as has been well known since the foundational work of Kratzer (1977, 1981, 1991). In English, modal auxiliaries such as *must*, *may*, and *could* can have a range of readings, including epistemic, deontic, and circumstantial. Kratzer ascribes this variability to a contextual parameter that she calls the conversational background, which further divides into a modal base and an ordering source. English modals are compatible with conversational backgrounds of any type (though subject to a few idiosyncratic lexical restrictions). However, they each have a fixed modal force, acting as either universal or existential quantifiers over possible worlds, corresponding to the traditional modal operators  $\Box$  and  $\Diamond$  of modal logic.

However, the pattern of context dependency exemplified by modal auxiliaries in English and related languages cannot be universal, as we will show in our analysis of modality in St'át'imcets (Lillooet; Northern Interior Salish). There are two salient differences between

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English and St'át'imcets modals. First, in St'át'imcets, modals are lexically restricted as to the type of conversational background they allow. For instance, the modal clitic *k'a* can only have an epistemic reading, whereas the modal clitic *kelh* only allows future interpretations, unlike English *will*, which is not restricted to the future. Second, modals in St'át'imcets do not appear to have an inherently specified quantificational force. Depending on context, their modal force ranges from universal to existential. As a result, the same modal clitic will sometimes be translated into English as *must* or *should*, and sometimes as *may*, *might*, or *could*. Thus, the interpretation of modals in St'át'imcets is just as context dependent as in English, but in a different way. Whereas English modals have a fixed modal force but a varying conversational background, modals in St'át'imcets appear to have varying modal force but a fixed type of conversational background.

Our main goals in this paper are firstly to provide extensive empirical evidence for the pattern of modal variability in St'át'imcets described above, using data obtained both from texts and from elicitation, and secondly to provide a formal analysis of the (apparent) variability in force that St'át'imcets modals exhibit. Taking as our point of departure a recent analysis of English possibility modals proposed by Klinedinst (2005), we argue that modals in St'át'imcets are analogous to specific indefinites in English. Their semantics involves a free choice function variable (interpreted by the context) which selects a subset of the set of possible worlds that are accessible from the actual world according to the modal base. A distributive operator then quantifies over this subset of worlds. According to our analysis, then, modals in St'át'imcets receive a uniform interpretation as (distributive) pluralities. The appearance of variability in modal force arises because the choice function can select a larger or smaller subset of accessible worlds. At the end of the paper we suggest that it may be fruitful to reconsider the semantics of English modals in light of our analysis of modals in St'át'imcets: the differences between English modals and St'át'imcets modals are therefore perhaps not as great as they appear to be at first sight.

The structure of the paper is as follows. In the remainder of this section we provide theoretical background as well as some information on St'át'imcets. Section 2 discusses the three St'át'imcets modal clitics (*ka*, *k'a*, and *kelh*) that are at the core of our analysis, presenting extensive evidence for the context-dependent variability in their interpretation. Section 3 presents our analysis of St'át'imcets modals in terms of choice functions. In section 4 we extend the analysis to two other St'át'imcets modals (*-an'* and *ku7*), which have evidential interpretations. In section 5, we conclude by raising some typological issues in the semantics of modals, in particular the question of whether modals in English are perhaps amenable to an analysis akin to the one we propose for St'át'imcets.

## 1.2 Theoretical background: Kratzer's analysis of modals

Modals introduce quantification over possible worlds. For example, English *must* is a universal quantifier over worlds, while *may* is an existential quantifier. Modals also involve implicit conversational backgrounds, which vary depending on context (Kratzer 1977, 1981, 1991). For example, *must* (along with many other modals) allows both epistemic and deontic readings, as shown in (1-2).

- (1) Michl must be the murderer. (In view of what is known about the crime.)  
 EPISTEMIC (Kratzer 1991:643)
- (2) Jockl must go to jail. (In view of what the law provides.)  
 DEONTIC (Kratzer 1991:640)

The implicit conversational background determines an accessibility relation between worlds, which in turn delimits a *modal base* or set of accessible worlds over which the modal quantifies. The *ordering source* further restricts the set of worlds quantified over, by ranking worlds in some contextually-determined way and restricting the domain of quantification to worlds at one end of the ranking. For example, in (1), *must* quantifies over worlds which are compatible with what is known about the crime (an epistemic modal base). The worlds quantified over are further restricted to those which are closest to the evaluation world in terms of ‘the normal course of events’ (a stereotypical ordering source). Thus, it is not required that in unusual worlds where aliens murder humans, Michl is the murderer. In (2), *must* quantifies over worlds which are compatible with a certain set of facts in the evaluation world (a circumstantial modal base), and which are closest to the ideal given by ‘what the law provides’ (a normative ordering source).

The definition of a necessity modal is provided in (3); this says that the proposition *p* is true in all worlds in the modal base that ‘come closest to the ideal established by the ordering source’ (Kratzer 1991:644).

- (3) A proposition *p* is a **necessity** in a world *w* wrt a modal base *f* and an ordering source *g* iff the following condition is satisfied: For all  $u \in \cap f(w)$  there is a  $v \in \cap f(w)$  such that  $v \leq_{g(w)} u$  and for all  $z \in \cap f(w)$ : if  $z \leq_{g(w)} v$ , then  $z \in p$  (Kratzer 1991:644)

### 1.3 Language background and methodology

St’át’imcets (a.k.a. Lillooet) is a Northern Interior Salish language spoken in British Columbia, Canada. It is extremely endangered, with fewer than a hundred speakers, all elderly. The data in this paper are presented in the official St’át’imcets orthography, developed by Jan van Eijk.

The claims about interpretation presented here are based on primary fieldwork as well as on textual resources. Our fieldwork involves direct elicitation of: (i) translations (in either direction) of sentences in particular contexts, (ii) judgements about truth in particular contexts, (iii) judgements about felicity in particular contexts, and (iv) consultants’ comments about interpretation. This full range of elicitation techniques has been used to arrive at claims about interpretation. Readers are referred to Matthewson (2004) for further discussion of our fieldwork methodology.

## 2. St'át'imcets modals appear to allow variable quantificational force

In St'át'imcets, elements involving quantification over worlds require a particular type of conversational background, while appearing to allow varying quantificational strengths.<sup>1</sup> In this section, we focus on the three elements listed in (4).<sup>2</sup>

- (4) a. *k'a* epistemic  
b. *kelh* future  
c. *ka* deontic or irrealis

The items in (4a-c) are all second-position clitics. They form part of a set of fifteen second-position elements in the language (van Eijk 1997:199-206). This set of enclitics also includes markers of illocutionary force, speaker attitude, and temporal reference, as well as (optionally) demonstrative pronouns. The clitics generally occur in a fixed order, following subject enclitics, and attach to the first predicative element of the clause (either the first auxiliary, if there is one, or the main predicate, otherwise). Some second position enclitics (including *k'a* and *ka*) also occur in typical adverbial positions; others (including *kelh*) do not.

In the following sub-sections we present data showing that each of these modals has a lexically-fixed conversational background, but apparently variable quantificational force.

### 2.1 Epistemic *k'a*

*k'a* is one of three evidential clitics in St'át'imcets. In Matthewson, Rullmann and Davis (2006) we argue that St'át'imcets evidential clitics should be analyzed as modals which are restricted to (various kinds of) epistemic conversational backgrounds.<sup>3</sup> The St'át'imcets evidentials are therefore similar to the Bulgarian Perfect of Evidentiality, as analysed by Izvorski (1997), and differ from the Quechua evidentials analysed by Faller (2002) as illocutionary operators.<sup>4</sup> We

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<sup>1</sup> We say 'appearing to', because our analysis will not involve ambiguity or polysemy. Instead, we will show that all the data can be captured by a uniform analysis using choice functions.

<sup>2</sup> There is one element which we suspect is a (circumstantial) modal which we do not discuss here: the so-called 'out-of-control' marker *ka...a*. This element gives rise to a range of readings including 'suddenly', 'accidentally', 'manage to' and ability (see Demirdache 1997).

<sup>3</sup> For recent work on epistemic modality, see von Stechow (2005) and Papafragou (2006), among others.

<sup>4</sup> For example, in Matthewson, Rullmann and Davis (2006) we show that (a) the St'át'imcets evidentials pass the challengeability test (which illocutionary operators fail), (b) St'át'imcets evidentials may be semantically embedded, and (c) unlike some Quechua evidentials (Faller 2002), St'át'imcets evidentials do not allow the speaker to be sure that the embedded proposition is false. For relevant discussion of evidentials, see Blain and Dechaine (to appear), Chung (2005, in press, to appear), Ehrlich (2001), Faller (2002, 2003, to appear a,b), Garrett (2000), Ifantidou-Trouki (1993), Lecarme (2005), McCready and Asher (2005), McCready and Ogata (2006), Palmer (1995), Pancheva (2005), Papafragou (2000), among many others. For recent work on epistemic modality, see von Stechow (2005), among others.



e. *Context: His car isn't there.*

plan **k'a** qwatsáts  
already**INFER** leave  
'**Maybe** he's already gone.'

Spontaneously produced textual examples confirm our claim that *k'a* is not restricted in quantificational force. The examples in (7-11) are all drawn from oral narratives. In (7), the context supports a universal epistemic claim. Immediately following (7) in the text, the speaker explains that a neighbour got angry at her and her friends. The speaker clearly perceives the anger to be a result of the loudness.

(7) *Context: Speaker is telling about when she was a child and she used to play in the evenings with her friends.*

na s-pála7-s-a, wá7-lhkalh **k'a** wenácw-ts-am'  
DET NOM-one-3POSS-DET IMPF-1PL.SUBJ **INFER** true-mouth-MID  
'One time, we must have been loud.' (Matthewson 2005:410)

In (8) also, the context appears to support a universal epistemic modal claim. There is strong evidence in the context that Jim Hoffmann is frightened.

(8) *Context: Jim Hoffmann thought he saw a sasquatch and came running back with huge terrified eyes.*

ka-q'us-tum'-á **k'a** wi7  
OOO-frighten-PASS-OOO **INFER** EMPH  
'It really must have frightened him!' (Matthewson 2005:418)

(9) is another universal example. Since the speaker knew her teacher very well and presumably had access to abundant evidence regarding her age, it would have been true in *all* stereotypical worlds consistent with the observed evidence that the teacher was old.

(9) *Context: Speaker is talking about her first-grade teacher.*

plan **k'a** wi7 qelhmín  
already**INFER** EMPH old.person  
'She was already old.' (Matthewson 2005:127)

In (10-11), we see existential uses of *k'a* drawn from texts. In (10), the first sentence explicitly states that the speaker is unsure about the truth of the proposition embedded under *k'a* in the second sentence. This seems to suggest that existential force is involved. Note that we cannot conclude in this context that the speaker's mother *must* have put the fish away for eating later. She could have given it to relatives, for example.

(10) cw7aoz kw-en-wá stexw lexláx-s lh-as  
 NEG DET-1SG.POSS-IMPF very remember-CAUS HYP-3CONJ  
 kás-tum' i sk'wílh-a ts'úqwaz'  
 what-1PL.ERG DET.PL leftover-DET fish  
 'I don't really remember what we did with the leftover fish.'

wa7 k'a qelh-n-ás nilh kw s-ts'áqw-an'-em  
 IMPF **INFER** put.away-DIR-3ERG FOC DET NOM-eat-DIR-1PL.ERG  
 lh-kalál-as  
 HYP-soon-3CONJ  
 'Maybe she put it away and we ate it later.' (Matthewson 2005:58)

In (11), the speaker is making a guess as to how long the time period was before the three boys came. There is no reason why it *must* have been two weeks.

(11) *Context: I was the only Indian when I first went to school.*

t'u7 ptak i án'was-a k'a xetspásq'et nilh s-cuz'-s  
 but pass DET.PL two-DET **INFER** week FOC NOM-going.to-3POSS  
 ts7as i nkekalhás-a twéw'w'et lhláta7 sek'wel'wás-a t'it  
 come DET.PL three(HUMAN)-DET boy DEIC Cayoose.Creek-DET also  
 'But after maybe two weeks, three boys came, also from Cayoose Creek.'  
 (Matthewson 2005:119)

An elicited example suggestive of existential force is given in (12). Here, a continuation asserting that perhaps the embedded proposition is false is accepted by consultants. Note the oddness of an English translation of (12) involving *must*; note also the prediction of the schemas in (13) that only an existential quantifier gives non-contradictory results here.

(12) *Context: There is some evidence that John has left, e.g. his bag has gone, but maybe he just took his bag to the bathroom.*

qwatsáts k'a tu7 k John, t'u7 wa7 k'a sxek  
 leave **INFER** then DET John but IMPF **INFER** maybe  
 k-wa-s cw7aoz t'u7 k-wa-s qwatsáts  
 DET-IMPF-3POSS NEG just DET-IMPF-3POSS leave  
 'John may have left, but maybe he hasn't left yet.'

- (13) a.  $\diamond\phi \wedge \diamond\neg\phi$  CONTINGENCY  
 b.  $\square\phi \wedge \diamond\neg\phi$  CONTRADICTION

A similar test is applied in (14). In this context, both negative and positive modal assertions are possible. This is consistent only with an existential quantification over possible worlds. Even a single sentence which combines the positive and negative assertions is accepted, as shown in (14c), although consultants do not find (14c) to be a very natural sounding sentence.





(20) shows that there is no epistemic reading for *kelh*. In the context given, where the claim is about the nephew’s probable sleeping-state at the utterance time, future *kelh* is unacceptable and epistemic-inferential *k’a* must be used instead.

(20) *Context: Someone phones wanting to talk to your nephew and you tell them ‘He went to bed half an hour ago; he’ll be asleep by now.’*

# plan k’a sáq’ulh hour kw s-nas-ts tu7 kíts-lec;  
 alreadyINFER half hour DET NOM-go-3POSS then lie-AUT  
 plan **kelh** wa7 guy’t  
 alreadyFUT IMPF sleep  
 ‘He already went to bed half an hour ago; he will [future] already be asleep.’

The second difference between *kelh* and *will* is that *kelh* seems to allow variable quantificational force. *kelh* allows translations into English involving existential *might* as well as universal *will*.<sup>10</sup> Conversely, speakers also often translate English sentences containing *might* into St’át’imcets using *kelh*. Some examples of *might* translations are given in (21-24).

(21) ka-kwís-a **kelh** ti k’ét’h-a  
 OOC -fall-OOC FUT DET rock-DET  
 ‘That stone might drop.’

(22) lh-tq-álk’-em-an ka-gúy’t-kan-a **kélh** tu7  
 HYP-touch-string-MID-1SG.CONJ OOC-sleep-1SG.SUBJ-OOC FUT then  
 ‘If I drive I might (accidentally) fall asleep.’

(23) tecwp **kelh** kw s-Mary ku kaoh  
 buy FUT DET NOM-Mary DET car  
 ‘Mary might buy a car.’ (St’át’imcets volunteered)

(24) nas **kelh** píx-em’ kw s-John  
 go FUT hunt-MID DET NOM-John  
 ‘John might go hunting.’

Textual examples confirm the variability of quantificational force. In (25), the speaker fully intends to talk about the First of July celebrations, and begins doing so immediately after the sentence in (25). This is therefore a universal usage.

(25) nilh **kelh** aylh ti tsláoyam-a cuz’ qwal’el’t-mín-an  
 FOC FUT then DET 1st.of.July-DET going.to speak-RED-1SG.ERG  
 ‘Now I’m gonna talk about the First of July celebrations.’ (Matthewson 2005:82)

<sup>10</sup> Van Eijk (1997:201) observes that *kelh* ‘refers to a (possible) future event. It is often translatable with ‘might’.’



(30) *Context: You are driving past your friend's house and you notice her son's car in the driveway and you say 'Jimmy might be back.'*

- a. t'íq-as-**an** p'an't kw s-Jimmy  
 arrive-3CONJ-**PERC.EVID** return DET NOM-Jimmy  
 'It looks like Jimmy is back.' (volunteered form)
- b. # t'íq **kelh** p'an't kw s-Jimmy  
 arrive **FUT** return DET NOM-Jimmy  
 'Jimmy might come back.'

We have seen in this subsection that *kelh* allows variable quantificational force, and that it only allows conversational backgrounds which give rise to future readings.

### 2.3 Deontic / irrealis *ka*

The clitic *ka* has two uses. First, it is the primary means in the language of expressing deontic readings. (*Ka* is glossed as 'obligation / expectancy' by van Eijk 1997.) As shown in (31-34), the quantificational force does not appear to be lexically specified. Both universal deontic (*must/have to/should*) and existential deontic (*may/can*) translations are freely given and accepted.

(31) cúy'-lhkacw **ká** t'u7 nas áts'x-en (ta) kwtámts-sw-a  
 going.to-2SG.SUBJ **DEON** PART go see-DIR (DET) husband-2SG.POSS-DET  
 'You must go to see your husband.'

(32) kan **ka** kw-en-s ulhchw  
 YNQ **DEON** DET-1SG.POSS-NOM enter  
 'Should / can / may I come in?'

(33) qwatsáts-kacw **ka**  
 leave-2SG.SUBJ **DEON**  
 '(Maybe) you should leave.'

(34) lán-lhkacw **ka** áts'x-en ti kwtámts-sw-a  
 already-2SG.SUBJ **DEON** see-DIR DET husband-2SG.POSS-DET  
 'You must / can / may see your husband now.'

(35) is a textual example of deontic *ka* with unambiguously universal force. An existential interpretation (i.e., 'I think we *could* eat them because they were always having babies') would not make sense in the context; the speaker's family ate several other kinds of farm animals which are not prolific breeders.

(35) *Context: I don't remember if we ate the rabbits or not.*

t'u7 wa7 **ka** n-scwákwekw-a ts'áqw-an'-em nilh s-pápt-s-a  
 but IMPF **DEON** 1SG.POSS-heart-DET eat-DIR-1PL.ERG FOC NOM-always-3POSS-DET  
 wa7 tecwecw-wít lh-as kwís-alt i sqweyíts-a  
 IMPF increase-3PL HYP-3CONJ fall-child DET.PL rabbit-DET  
 'But I think we had to eat them because they were always having babies.'  
 (Matthewson 2005:98-99)

In texts, it is difficult to find clear examples of unambiguously existential deontic *ka*.<sup>12</sup> However, elicited data confirm that an existential reading is possible. In (36), the consultant's comment makes it clear that she understands the deontic modal to have existential force. The sentence means that the eggs *can* stay buried for one year, not that they *must* stay buried for one year.<sup>13</sup>

(36) wa7 **ka** s-lep' i k'ún7-a ku pála7 máqa7  
 IMPF **DEON** STAT-bury DET.PL fish.egg-DET DET one snow  
 'The eggs can stay in the ground for a year.'

Consultant's comment: "As long as one year. Some just stay buried for three months."

Further evidence for an existential interpretation of deontic *ka* is provided by using the schemata in (37). We can establish that *ka* is licit in constructions which would lead to contradictions with universal quantifiers.<sup>14</sup>

- |      |    |  |               |
|------|----|--|---------------|
| (37) | a. | $\diamond\phi \wedge \diamond\neg\phi$ | CONTINGENCY   |
|      | b. | $\diamond\phi \wedge \neg\Box\phi$     | CONTINGENCY   |
|      | c. | $\diamond\phi \wedge \Box\neg\phi$     | CONTRADICTION |
|      | d. | $\Box\phi \wedge \diamond\neg\phi$     | CONTRADICTION |

In (38), the context forces an existential interpretation for the modal; under a universal interpretation, the two clauses together would produce a contradiction. The same is true in (39).

<sup>12</sup> In general, *ka* is rare in texts. In all of Matthewson (2005), there are only four instances of *ka*, only two of which are deontic.

<sup>13</sup> Another consultant interpreted (36) as meaning that the eggs *must* stay in the ground for one year. This variability in judgments is consistent with our claim that both interpretations are available.

<sup>14</sup> We cannot test sentences which literally have the form 'MODAL $\phi \wedge$  MODAL $\neg\phi$ ' (i.e., where the exact same proposition is used affirmatively and negatively). This is because St'át'imcets modals display reduced scopal possibilities with respect to negation (much as in English; cf. e.g., Horn 1989). See Matthewson, Rullmann and Davis (2006) for some discussion of scopal interactions between modals and negation.

- (38) *Context: You are going for a job interview and the receptionist outside the office tells you that you can leave your bag there, but you can also take it with you when you go in.*

lhwal-en-lhkácw      **ka**      lts7a    tu      wa7    s-zácen-su;  
 leave-DIR-2SG.SUBJ    **DEON**    DEIC    DET    IMPF    NOM-carry-2SG.POSS  
 kwán-lhkacw            lh-xát'-min'-acw  
 take(DIR)-2SG.SUBJ    HYP-want-RED-2SG.CONJ  
 'You can leave your stuff here; take it if you want to.'

- (39) lán-lhkacw            **ka**      áts'x-en ti      kwtámsts-sw-a,            t'u7      áoz-as  
 already-2SG.SUBJ    **DEON**    see-DIR    DET    husband-2SG.POSS-DET    but      NEG-3CONJ  
 k-wá-su                    xát'-min'    k-wá-su                    nás-al'men, t'u7      áma  
 DET-IMPF-2SG.POSS    want-RED    DET-IMPERF-2SG.POSS    go-want      just    good  
 'You may go see your husband, but you don't have to.' (literally: '... if you don't want to go, that's okay.')

Besides deontic readings, *ka* also appears in a range of constructions which share an irrealis semantics (to be made more precise below; this correlates with Davis's (in prep.) use of the term 'irrealis' for *ka*). These include counterfactual conditionals, non-counterfactual conditionals, and counterfactual wishes. Roughly speaking, in all its irrealis uses, *ka* requires that the embedded proposition be false. In its irrealis uses, either existential or universal quantificational force is possible, as we illustrate in the rest of this section.<sup>15</sup>

In (40), the consultant spontaneously understands the sentence to mean that she *would* have won a lot of money – that is, that she had the right numbers on the lottery ticket. This is a universal interpretation of irrealis *ka*.

- (40) t'cum **ka**    ku    cw7it    sqlaw', t'u7    pel'p-s-ás      ta    ticket-s-a  
 win    **IRR**    DET    many    money    but    lose-CAUS-3ERG    DET    ticket-3POSS-DET  
 'She would have won a lot of money, but she lost her lottery ticket.'

Consultant's response: "Oh my god, gee that's terrible."

For the existential interpretation where she *could* have won, but we don't know whether she would have (because we don't know which numbers were on the lost ticket), the consultant

<sup>15</sup> We give data here only involving counterfactual and non-counterfactual conditionals. An example of a wish is given in (i):

- (i) qwatsáts-as      **ka**      ti      sqáycw-a  
 leave-3CONJ    **IRR**    DET    man-DET  
 'I wish the man would leave.'

Besides *ka*, (i) contains subjunctive subject marking (glossed 'CONJ' for 'conjunctive', following common Salishanist terminology). Subjunctive marking alters the meaning; without it, (i) would be translated as 'The man should leave'. In line with this, van Eijk (1997:213) observes that '[w]here *-ka* occurs with subjunctive endings, it generally expresses a wish, whereas *-ka* with indicative suffixes expresses 'would, should'.' The analysis of St'át'imcets subjunctive marking is a matter for future research.

also allows *ka*, but supplements the sentence with the ‘counter to expectation’ element *séna7*. Since any random lottery ticket is very unlikely to have actually been a winner, *séna7* indicates that although she *could* have won, it would have been very unlikely.

- (41) t’cum **ka** séna7 ku cw7it sqlaw’,t’u7 pel’p-s-ás ta  
 win **IRR** COUNTER DET many money but lose-CAUS-3ERG DET  
 ticket-s-a  
 ticket-3POSS-DET  
 ‘She could have won a lot of money, but she lost her lottery ticket.’

The data in (42) and (43) show that conditionals are accepted in contexts which force either existential or universal interpretations.

- (42) zúqw-s-as **ka** ta sk’úk’wmi7t-a ti7 ku  
 die-CAUS-3ERG **IRR** DET child-DET DEMON DET  
 swúw’a, lh-cw7áo7-as kw s-qus-cit-ítas  
 cougar HYP-NEG-3CONJ DET NOM-shoot-APPL-3PL.ERG  
 ‘That cougar would/could have killed a child if they hadn’t shot it.’

*Context 1: The cougar was on a rampage and was killing cats, dogs, raccoons, and it had a child cornered and was growling; it would have killed a child.*

*Context 2: You just know that cougars sometimes kill children when they venture into built-up areas; it could have killed a child.<sup>16</sup>*

- (43) zikt **ka** láti7 ku srap, lh-gelgel-ás ta sk’éxem-a  
 fall **IRR** DEIC DET tree HYP-strong-3CONJ DET wind-DET  
 ‘That tree would/could fall, if the wind got strong.’

*Context 1: You are saying that the tree needs to be chopped down because it’s a danger; it’s gonna fall in the first strong wind; it would fall.*

*Context 2: You are the paranoid type who doesn’t put things on high shelves in case of earthquakes, doesn’t drive behind logging trucks in case a tree falls off the back, etc. and you don’t want to pitch your tent underneath a tree because the tree could fall if the wind got strong. (i.e., it’s not that the tree looks particularly weak.)*

In (44), we see that the same first clause containing irrealis *ka* may be followed either by a continuation which forces existential quantification, or by ‘I told you it’, which is the closest St’át’imcets equivalent of English ‘I promise you’.

<sup>16</sup> For the second context, the consultant changes the determiner on ‘child’ to reflect the unknown nature of any potential child who might be killed; instead of *ta sk’úk’wmi7ta*, the consultant offers *ku sk’úk’wmi7t*. See van Eijk (1997), Matthewson (1998, 1999), Davis (in prep.) for discussion of St’át’imcets determiner semantics.

(44) lháxw-kacw **ka** lh-q'em-ens-ácw tákem i meláomen-sw-a ...  
 heal-2SG.SUBJ **IRR** HYP-swallow-DIR-2SG.CONJ all DET.PL medicine-2SG.POSS-DET  
 'If you took your medicine, you might/would get better ...'

i. kán-as kelh kw s-ka-7áma-sw-a  
 YNQ-3CONJ FUT DET NOM-OOC-good-2SG.POSS-OOC  
 'I don't know if you'll get well or not.'

ii. tsun-tsi-lhkán tu7  
 say(DIR)-2SG.OBJ-1SG.SUBJ then  
 'I told you it / I promise.'

The deontic and the irrealis readings are the only possibilities for *ka*. For example, *ka* never has epistemic readings, as illustrated in (45).

(45) nilh **k'a** / **\*ka** kw s-Mary ku kuk-un'-táli  
 FOC **INFER** / **\*KA** DET NOM-Mary DET cook-DIR-TOP  
 'Mary could have cooked this.' (It tastes like her cooking.)

In summary, *ka* is restricted to either deontic or irrealis uses, and on both deontic and irrealis uses can have either existential or universal interpretations.

## 2.5 Universal quantification as a default

We have shown that the three St'át'imcets modals *k'a*, *kelh* and *ka* all appear to allow either existential or universal interpretations. It should be noted, however, that there is a preference for the universal interpretation. For example, textual examples of future *kelh* involve a preponderance of universal interpretations, and we have noticed that in elicitation contexts, universal translations are often preferred for deontic *ka*. One reason for the tendency towards a universal interpretation is that the language possesses ways to overtly disambiguate in favour of the existential. For example, existential interpretations of modals often involve a co-occurring adverb *sxek* 'maybe', as illustrated in (46-47). We return to the issue of a default universal force in section 3.3 below.

(46) lh-7ámh-as kw s-qwal'út-s-al'ap **sxek** um'-en-tumulh-ás **kelh**  
 HYP-GOOD-3CONJ DET NOM-talk-CAUS-2PL.ERG **maybe** give-DIR-2PL.OBJ-3ERG **FUT**  
 'If you talk to him nicely, he might give you some.' (van Eijk and Williams 1981:59)

(47) nilh ku cw7aoy-s kw s-k'úl'-em múta7 ku pála7 **k'a**  
 FOC DET NEG-3POSS DET NOM-make-MID again DET one **INFER**  
**sxek** xetspásq'et  
**maybe** week  
 'So she wouldn't have to make more for about a week maybe.' (Matthewson 2005:147-8)

### 3. A choice-function analysis of St'át'imcets modals

#### 3.1 What is the source of the variable modal force?

In the preceding section we argued that there is a striking and systematic difference between modals in St'át'imcets and modals in English. English modals have a fixed quantificational force (i.e., they are either universal or existential quantifiers over possible worlds) but are variable in the kind of conversational background they allow (i.e., the same modal can have deontic, epistemic, or circumstantial readings). Modals in St'át'imcets on the other hand are restricted to a particular kind of conversational background (*k'a* is always epistemic, *kelh* is always future, and *ka* can only be deontic or irrealis), but they appear to be very flexible in their quantificational force, allowing both universal and existential interpretations.

In this section we address the central question of how the variability of modal strength in St'át'imcets should be accounted for. At first glance, there would appear to be the following four possibilities:

(48) *Possible analyses of variability in modal strength*

- I. Ambiguity: St'át'imcets modals are lexically ambiguous between  $\forall$  and  $\exists$  readings.
- II. Underspecification: St'át'imcets modals are quantifiers whose force is somehow underspecified.
- III.  $\exists$  plus strengthening: Lexically, St'át'imcets modals have only one reading, the existential one. The (apparent) universal readings come about through a pragmatic mechanism of strengthening.
- IV.  $\forall$  plus weakening: Lexically, St'át'imcets modals have only one reading, the universal one. The (apparent) existential readings come about through a pragmatic mechanism of weakening.

We first discuss the prospects of options I-III, concluding that none of them are very promising. The eventual solution we develop (based on a recent proposal by Klinedinst 2005) can be regarded as a specific implementation of option IV.

Option I (lexical ambiguity) offers perhaps the most straightforward account, but is not very attractive from a theoretical perspective. Positing a lexical ambiguity is not only rather uninteresting, it also is in danger of violating Grice's Modified Occam's Razor: "Senses are not to be multiplied beyond necessity" (Grice 1975). It is clear moreover that we are not dealing with the accidental homophony of textbook cases such as *bank* or *pen*. The ambiguity of St'át'imcets modals is systematic in that it affects all modals in the same way. Moreover, the two interpretations are clearly related in that they are both quantifiers over possible worlds, which differ only in their quantificational force. We therefore take the position that a more explanatory account is possible and we should appeal to lexical ambiguity only as a last resort.

By this reasoning, option II (underspecification) is perhaps more attractive. However, it is important that we spell out what exactly is meant by semantic underspecification in this case. A prototypical example of lexical semantic underspecification is the word *child*, which is underspecified (or non-specified) for gender, because its denotation includes both boys and girls. This is very different from claiming that *child* is ambiguous between the meanings 'boy' and 'girl' in the way that *pen* is ambiguous between the meanings 'writing implement' and

‘enclosure’. *Child* has only one meaning, which is neutral with respect to gender and therefore encompasses both boys and girls.<sup>17</sup> An underspecification analysis therefore avoids the problem of the Modified Occam’s Razor because it does not postulate multiple senses.

However, it is not clear how such an analysis could be implemented for the problem at hand. Because *must* entails *can* (following the usual assumption that universal modals carry existential commitment), the single ‘neutral’ reading that the underspecification analysis would posit for the modal would actually be the existential one. The underspecification analysis would thus be tantamount to the claim that St’át’imcets modals are unambiguously existential, and it therefore reduces to option III.

According to option III, St’át’imcets modals are unambiguously existential, but under certain conditions they can be pragmatically strengthened to something akin to the universal reading. The crucial question concerns the nature of this pragmatic strengthening mechanism.

The first possibility that comes to mind is scalar implicature. *Can* and *must* are naturally ranked on a scale, with *can* being weaker than *must* (cf. Horn 1972, 1989). However, it is easy to see that this approach would give us exactly the wrong predictions. A scalar implicature comes about when there is a so-called Horn scale  $\langle X_1, \dots, X_n \rangle$  of lexical items, such that  $X_{i+1}$  is stronger than  $X_i$  (for any  $i$ ). By asserting a proposition  $P(X_i)$ , the speaker implicates that  $P(X_j)$  is false for any  $j > i$  (assuming  $P$  is an upward entailing context), because the Maxim of Quantity requires the speaker to make the strongest (most informative) statement that is in accordance with the available evidence. So, for instance, (49a) implicates (49b), and (50a) implicates (50b):

- (49) a. Some students failed the test  
b. Not every student failed the test.
- (50) a. You may go.  
b. You don’t have to go.

Clearly, scalar implicatures of this kind cannot explain the strong reading of St’át’imcets modals. First of all, in St’át’imcets there is no choice between a weaker and a stronger lexical item; there is only one lexical item, whose strength is variable. Secondly, if there were a scalar implicature it would yield the result that the universal (strong) reading is false, whereas what we need to explain is why the universal reading applies (and is even the default). Note also that the Strongest Meaning Hypothesis of Dalrymple et al. (1994, 1998) cannot be extended to derive the St’át’imcets modal data. The Strongest Meaning Hypothesis ensures that with an ambiguous expression (in Dalrymple et al.’s case, reciprocals), the logically strongest meaning emerges, unless that meaning would lead to a contradiction based on the lexical meaning of the elements it combines with. (For example, the strongest reading of ‘the plates are on top of each other’ would require that each plate is on top of every other plate, something which is clearly impossible, so the reading does not surface.) That is not the case with the St’át’imcets modals. The interpretations of the modals are not restricted by lexical content, but instead, the same string can receive different interpretations depending on discourse context. In addition, the interpretation which does not arise in any given context is not contradictory. Finally, the ‘missing’

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<sup>17</sup> See Zwicky and Sadock (1975) and Cruse (1986) for discussion of this distinction and empirical tests.

interpretations in St'át'imcets are only non-defaults, rather than unattested as with the reciprocal data.

This leaves us with option IV, the claim that St'át'imcets modals are unambiguously universal, but that there is some pragmatic mechanism that weakens their interpretation to something resembling an existential reading. There is a precedent for this kind of idea, namely the implicit domain restriction on quantifiers (see e.g. Westerstahl 1985, von Stechow 1994, Martí 2003, Stanley and Szabo 2000). *Everybody* in (51a), for instance, will normally not be taken to mean that everybody in the universe of discourse smiled, but just that every member of some contextually salient set of people did (for instance, everybody in the room). Formally, this is often implemented by assuming the semantic representation of (51a) contains an implicit free predicate variable  $R$  restricting the universal quantifier;  $R$  receives its value from the context.

- (51) a      Everybody smiled  
       b.       $\forall x[[\text{person}(x) \wedge R(x)] \rightarrow \text{smiled}(x)]$

The presence of  $R$  amounts to a pragmatic mechanism for weakening the force of the quantifier. Our analysis of the variable quantificational force of St'át'imcets modals will be similar to this, in that it involves a contextually determined restriction that weakens the force of the modal.

### 3.2 Klinedinst's analysis of possibility modals

Our analysis is inspired by Klinedinst's (2005) recent proposal for the semantics of possibility modals in English. Klinedinst presents a novel explanation of the so-called 'puzzle of free-choice permission', based on the idea that possibility modals (in English) are analogous to plural indefinite DPs. In the same way that plural indefinites existentially quantify over pluralities of entities, possibility modals existentially quantify over pluralities of possible worlds. Another crucial part of the interpretation of possibility modals according to Klinedinst is distributivity. The individual worlds that are members of the plurality of worlds introduced by the existential quantifier are universally quantified over. Thus the logical structure of possibility modals can be represented as in (52), where  $B$  is the modal base:<sup>18</sup>

$$(52) \quad [[\text{MODAL}(B)(w)(\phi)]] = 1 \text{ iff } \exists W[W \subseteq B(w) \wedge \forall w[w \in W \rightarrow \phi(w)]]$$

(adapted from Klinedinst 2005:19)

The modal is interpreted with respect to a given modal base  $B$  and a possible world  $w$  (the evaluation world). In our formalization we treat these as object-level variables which are arguments of the modal rather than as parameters of interpretation, but nothing much hinges on that choice for the semantics.<sup>19</sup>  $B(w)$  is the set of worlds that are accessible from the evaluation world  $w$  given the modal base  $B$ . The right-hand side of (52) can therefore be paraphrased as

<sup>18</sup> For the sake of simplicity, pluralities of possible worlds are modeled as sets, but there is nothing that hinges on the choice (we could have used Linkian sums of worlds as well).

<sup>19</sup> We remain agnostic, for instance, as to whether  $w$  and  $B$  should also be present as empty categories in the syntax of St'át'imcets.

“there is a set of worlds  $W$  that are accessible from  $w$ , such that  $\phi$  is true in every world in  $W$ ”, or more succinctly, “in some set of accessible worlds  $W$ ,  $\phi$  is true”.

Now it is obvious that, assuming  $W$  is non-empty, (52) is truth-conditionally equivalent to (53), the standard analysis of possibility modals (where  $R$  is the accessibility relation and  $R(w,w')$  means that world  $w'$  is accessible from  $w$ ).

$$(53) \quad \exists w'[R(w,w') \wedge \phi(w')]$$

So what is the reason for using the more complex representation (52), containing a variable representing a plurality of worlds, as well as a universal quantifier distributing over the individual members of this plurality? The motivation will become clear in the next subsection.<sup>20</sup>

### 3.3 St’át’imcets modals as specific indefinites

Klinedinst’s account of possibility modals in English offers a new perspective on the variable interpretation of modals in St’át’imcets as either universal or existential. We adopt Klinedinst’s proposal as the basis for an analysis of *all* modals in St’át’imcets, but with a twist. As mentioned above, (52) is truth-conditionally equivalent to the traditional existential interpretation of possibility modals. According to Klinedinst, possibility modals are analogous to plural indefinites (“there is a set of worlds  $W\dots$ ”), which he represents by means of a variable  $W$  over pluralities of worlds, which is bound by an existential quantifier. We propose that St’át’imcets modals are analogous to *specific* plural indefinites (“there is a *specific* set of worlds  $W\dots$ ”). On that reading the universal quantifier (the distributor) over the members of the set  $W$  will come to the fore, which explains why St’át’imcets modals are often translated as strong modals (‘must’).

There is an extensive literature on specific indefinites. Depending on one’s theory, saying that the set  $W$  represents a specific indefinite could mean a number of different things, including the claim that the speaker must have a particular set  $W$  “in mind”, or that the indefinite is an existential quantifier with wide scope, or that it is “referential” in some sense. Here we adopt a particular formal interpretation of specific indefinites involving choice functions (Reinhart 1997, Winter 1997, Kratzer 1998, Matthewson 1999, among others). In the same way that a choice function representing a specific indefinite determiner picks out an individual from the set denoted by the common noun (or NP), the modal choice function  $f$  will pick out a subset of the possible worlds that are accessible from the actual world. The universal quantifier then quantifies over the individual worlds that are members of the set picked out by  $f$ . Thus the interpretation of St’át’imcets modals can be represented as in (54).<sup>21</sup>

$$(54) \quad [[\text{MODAL}(f)(B)(w)(\phi)]] = 1 \text{ iff } \forall w' \in f(B(w)): [[\phi(w')]] = 1$$

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<sup>20</sup> Klinedinst’s own motivation is based on facts concerning the projection of conversational implicatures, which he argues explain what he calls conjunctive strengthening effects with possibility modals. Since this is orthogonal to the use we make of his proposal in the analysis of modals in St’át’imcets, we refer the reader to Klinedinst’s paper for his argumentation.

<sup>21</sup> We abstract away from the ordering source, using only a modal base for simplicity. However, see footnote 24 below.

According to our analysis, St’át’imcets modals thus involve *two* contextually determined parameters, the modal base B and the choice function f. The modal base B functions in the same way as it does in Kratzer’s analysis of English modals: it is a function which maps the evaluation world w onto the set of possible worlds that are accessible from it. The choice function f picks out a subset of B(w). The semantic type of f is therefore  $\langle st, st \rangle$ . f is moreover restricted in such a way that, for any set of worlds W,  $f(W) \subseteq W$ . Following Kratzer’s (1998) analysis of specific indefinites, we propose that f is a free variable whose value is determined by context.

How then does our analysis account for the apparent variability of the quantificational force of modals in St’át’imcets? We locate this in the choice of f rather than in the quantifier, which is uniformly universal.<sup>22</sup> The larger the subset of B(w) that is selected by f, the stronger the proposition that is expressed. As a limiting case, f may simply be the identity function. This results in a reading that is fully equivalent to the standard analysis of strong modals like *must* in English. However, if f selects a proper subset of B(w), the resulting reading is weaker, although it still involves universal quantification.

Let’s consider a particular example to illustrate how different choices of f explain the apparent quantificational variability of St’át’imcets modals:

- (55) qwatsáts-kacw            **ka**  
 leave-2SG.SUBJ            **DEON**  
 ‘(Maybe) you should leave.’

On our analysis this sentence can be paraphrased as “for a specific subset of deontically accessible worlds W, you leave in all worlds that are members of W”. Let us see how this arises. The modal *ka* requires a deontic modal base. Assume for the sake of concreteness that the modal base B maps the evaluation world w onto the set of worlds W in which you fulfill your parental duties (maybe you have a sick child at home that you need to take care of). The choice function f will now pick out a particular subset of W. If f is simply the identity function, the resulting reading is the same as on the standard analysis of strong modals. If f is not the identity function, it selects a proper subset of B(w). For instance, it could select all worlds in the modal base in which you not only fulfill your parental duties, but in which you are also home in time for dinner. The sentence then only says that in all those worlds, you leave. This means that there may be other worlds in which you fulfill your parental duties without leaving, for instance by calling your spouse and asking her/him to go home to take care of your child. Note that this reading is pragmatically very similar to weak modals on their standard analysis as existential quantifiers.

Here is an epistemic example:

- (56) t’cum            **k’a**   kw   s-John  
 win(MID)            **INFER** DET   NOM-John  
 ‘John must/may have won.’

(56) means approximately “for a specific subset of epistemically accessible worlds W, John won in all worlds that are members of W”. Assume that what the speaker knows about the situation is that John had played bingo last night and is spending lots of money today. The modal base

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<sup>22</sup> Here our analysis departs from that proposed in Matthewson, Rullmann, and Davis (2005).

therefore gives us all the worlds in which John had played bingo last night and is spending lots of money today. The choice function picks out a subset of these worlds. If  $f$  is the identity function, the reading is a standard strong modal reading: (Given his bingo-playing and money-spending), John must have won. However, suppose that  $f$  instead picks out the subset of accessible worlds in which John not only played bingo last night and is spending lots of money today, but also is unemployed. In that case, the sentence asserts that in all of the bingo-playing-money-spending-unemployed worlds, he must have won. However, the speaker of (56) does not *know* that John is unemployed.<sup>23</sup> This means that the sentence no longer makes a strong modal claim based on the known facts. Rather, it reduces to an existential claim: in some proper subset of the worlds compatible with the known facts, John won.<sup>24</sup>

According to this proposal, the apparent quantificational variability of modals in St'át'imcets is not due to ambiguity or underspecification of the modal quantifier itself, because it is uniformly universal. It also does not involve a dichotomy between two readings (one strong and one weak). Rather, there is a continuity of different degrees of strengths, depending on the size of the subset of  $B(w)$  that is selected by  $f$ . The smaller  $f(B(w))$  is, the more restricted the universal quantifier is, and the more likely it is to be translated as English *may*, *could*, or *might* rather than *must*. However, this apparent ambiguity is only an artifact of using English as the translation medium.

Finally, recall that in section 2.3 we noted that in St'át'imcets there is a default preference for a strong ('universal') interpretation of modals over a weak ('existential') one. If our analysis is correct, this default preference should be accounted for in terms of the status of the choice function which selects a set of accessible worlds. The fact that the strong interpretation is the default suggests that for some reason,  $f$  prefers to be the identity function. While we do not have a concrete analysis of why this should be, it is interesting that for independent reasons, Gillon (2006) has claimed that in another Salish language Skwxwú7mesh, the choice functions introduced by determiners prefer to be the identity function. Gillon uses this to account for the implicature of maximality which arises with choice-function DPs in Skwxwú7mesh. This same implicature of maximality holds with St'át'imcets choice function DPs (Matthewson 1999). It therefore seems that the preference for the identity function holds generally across the language. We do not know at this stage whether the preference for the identity function follows from general pragmatic principles (in which case we should expect similar default effects wherever choice functions are found, unless other language-specific factors interfere), or whether it is language-specific. This is an interesting question for further research.

### 3.4 Semantics of individual St'át'imcets modals

(54) is a general schema for the interpretation of modals in St'át'imcets. As we discussed in section 2, modals in St'át'imcets select a particular kind of modal base, unlike English modals which are much more liberal in that respect. We analyze this lexical restriction of St'át'imcets

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<sup>23</sup> See Kratzer (2003) for the proposal that in the nominal domain, the identity of the choice function may be unknown to the speaker of the sentence (cf. Kratzer's 'funeral example').

<sup>24</sup> The choice function actually performs a function partially similar to that of the ordering source. We leave the implications of this for future research.

modals as a *presupposition* on the modal base. In this section, we will spell out the analysis of each modal discussed so far.

### 3.4.1 Deontic *ka* and epistemic *k'a*

Let's start by looking at deontic *ka* (to be distinguished from irrealis *ka*, which we will discuss below in section 3.4.3).

(57) **Semantics of deontic *ka***

$[[ka(f)(B)(w)(\phi)]]$  is only defined if B is a deontic modal base and f is a choice function of type  $\langle st, st \rangle$  such that  $f(B(w)) \subseteq B(w)$ .

If defined,  $[[ka(f)(B)(w)(\phi)]] = 1$  iff  $\forall w' \in f(B(w)): [[\phi(w')]] = 1$

The assertion part of (57) is a straightforward implementation of the general schema (54). The presupposition adds the requirement that B be a modal deontic modal base and f a choice function that selects a subset of B(w).

Epistemic *k'a* can be analyzed analogously:

(58) **Semantics of *k'a* (epistemic)**

$[[k'a(f)(B)(w)(\phi)]]$  is only defined if B is an epistemic modal base and f is a choice function of type  $\langle st, st \rangle$  such that  $f(B(w)) \subseteq B(w)$ .

If defined,  $[[k'a(f)(B)(w)(\phi)]] = 1$  iff  $\forall w' \in f(B(w)): [[\phi(w')]] = 1$

Here *k'a* is treated as a general-purpose epistemic modal, analogous to epistemic readings of English modals like *must* or *may*. However, recall that *k'a* is actually one of several evidential clitics in St'át'imcets. In section 4, we give a more detailed analysis of the St'át'imcets evidential system. The comparison of *k'a* to the other evidentials will lead to some refinements of (58).

### 3.4.2 Future *kelh*

In (57) and (58) we abstracted away from the role of time. Time does of course play a crucial role in the semantics of the future modal *kelh*. Bringing in times leads to certain complications. For one thing, the modal base B must now be a function from world-time *pairs* to sets of worlds, because a world that was still accessible from the actual world yesterday, may no longer be accessible today.<sup>25</sup>

Recall that *kelh* is a future modal of variable strength which is sometimes translated into English as *will* and sometimes as *might*, but which can only have a temporal interpretation, and not for instance a dispositional reading. We will assume that the conversational background required by *kelh* is circumstantial in the sense of Kratzer (1981, 1991) (“in view of the relevant circumstances”); see also Copley (2002).

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<sup>25</sup> See Gamut (1991) for a discussion of the type of branching-world model assumed here.

(59) **Semantics of *kelh* (future)**

$[[kelh(f)(B)(w)(t)(\phi)]]$  is only defined if  $B$  is a circumstantial modal base and  $f$  is a choice function of type  $\langle st, st \rangle$  such that  $f(B(w,t)) \subseteq B(w,t)$ .

If defined,  $[[kelh(f)(B)(w)(t)(\phi)]] = 1$  iff  $\exists t' > t: \forall w' \in f(B(w,t)): [[\phi(w')(t')]] = 1$

Circumstantial modal bases are “realistic”, which means that  $w \in B(w,t)$  for all world-time pairs  $\langle w,t \rangle$ . Therefore, if  $f$  is the identity function, the proposition *kelh*  $\phi$  entails that  $\phi$  is true at some future time in the actual world. However, if  $f$  selects a proper subset of the modal base, *kelh*  $\phi$  is true iff  $\phi$  is true at some time  $t'$  at all worlds in  $f(B(w,t))$ , where  $f(B(w,t))$  does not have to include the actual world  $w$ .<sup>26</sup> In other words, if  $f$  is the identity function, *kelh*  $\phi$  entails that  $\phi$  *will* be true at a future time, but if  $f$  is not the identity function then the sentence merely entails that it *might* be true at a future time. Our analysis thus provides a unified account of the apparent ambiguity of *kelh* between *will* and *might* outlined above in section 2.2.

### 3.4.3 Irrealis *ka*

From a semantic viewpoint, the trickiest modal to analyze is irrealis *ka*, due to the well-known pitfalls of counterfactual conditionals. Here we can only give a very cursory discussion of its semantics.

In section 2.4 we presented a range of examples involving irrealis *ka*, focusing on its apparent quantificational variability, i.e., the fact that it sometimes seems to parallel English *would*, and sometimes English *could*. We will account for this variability in the same way as with the other modals, by means of the choice function  $f$ . However, an additional complication for the analysis of irrealis *ka* is the fact that it routinely occurs in counterfactual environments, where its semantics interacts with the temporal reference of the sentence. In English and some other languages, explicit distinctions are encoded between past counterfactuals (as in (60)), what Iatridou (2000) has called “future less vivid” conditionals (as in (61)), and Iatridou’s “future neutral vivid” conditionals (as in (62)).

- (60) If he had taken his medicine, he would have gotten better.
- (61) If he took his medicine, he would get better.
- (62) If he takes his medicine, he will get better.

(61) differs crucially from (60), in that worlds in which the antecedent becomes true are still considered accessible at the speech time in (61) but not in (60). At the same time, in (61) the antecedent becoming true is a more remote possibility than in (62). In English, the future less vivid conditionals involve the use of a present subjunctive (or “fake past tense”) in the antecedent, while past counterfactuals involve a double past. See Iatridou (2000), Ippolito (2003) and Arregui (2004) for discussion of the role of tense in conditionals.

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<sup>26</sup> Futures are often assumed to have a stereotypical ordering source (‘metaphysical’, in the terms of Copley 2002). This means that if the actual world turns out to be non-stereotypical,  $\phi$  need *not* be true at any future time in the actual world. As above, we note that the choice function has a partially similar (but not identical) result to an ordering source.

St'át'imcets does not explicitly mark the difference between past and present (see Matthewson to appear for extensive discussion), and therefore we might expect that the distinctions between the different types of conditionals are either not overtly expressed, or are expressed in a different way from in English. Preliminary fieldwork into the tense/conditional correlations suggests that conditionals containing *ka* can receive either of the interpretations in (60) or (61). On the other hand, for (62)-type interpretations, an overt future morpheme is preferred inside the antecedent clause. For example, (63) (repeated from (43) above) may be translated into English by native St'át'imcets speakers as either (i) or (ii), but does not get translated as 'That tree will fall, if the wind gets strong'.

- (63) zikt **ka** láti7 ku srap, lh-gelgel-ás ta sk'éxem-a  
 fall **IRR** DEIC DET tree HYP-strong-3CONJ DET wind-DET  
 (i) 'That tree would fall, if the wind got strong.'  
 (ii) 'The tree could have fallen, if the wind blew hard.'

There is much more work to be done on the interaction between tense and conditionals in St'át'imcets, and we leave that for another paper. We also do not address here the voluminous literature on the semantics of conditionals (counterfactual or non-counterfactual). We will only discuss the presupposition induced by irrealis *ka*, but not its assertion.

In past counterfactuals, *ka* presupposes that the proposition expressed by the clause it modifies must be false. This means that we take Davis' (in prep.) descriptive characterization of *ka* as an irrealis marker quite literally. The requirement for falsity appears to be quite strong; it resists cancellation, which suggests it is more than a conversational implicature.<sup>27</sup> Examples of attempts to cancel the falsity requirement are given in (64-65).

- (64) *Context: There were lots of children out for a walk near the cougar's den. That cougar could have killed a child – and in fact, it DID kill a child!*

Cannot use: # zúqw-s-as **ka** ta sk'úk'wmi7t-a ti7 ku swúw'a  
 die-CAUS-3ERG **IRR** DET child-DET DEMON DET cougar  
 'That cougar could have killed a child.'

Consultant's comment: "Then you wouldn't say *ka*. If it did [kill a child], then you'd say:

zúqw-s-as **tu7** ta sk'úk'wmi7t-a ti7 ku swúw'a  
 die-CAUS-3ERG **then** DET child-DET DEMON DET cougar  
 'That cougar killed a child.'

<sup>27</sup> St'át'imcets appears to contrast in this with English, where the falsity requirement *is* usually taken to be an implicature; see Ippolito (2003) and references therein.



noting that it is part of the more general issues concerning the role of tense in conditionals cross-linguistically.

#### 4. Applications and extensions: other evidentials

At this point, we have presented an analysis of three St’át’imcets modals: epistemic-inferential *k’a*, future *kelh*, and deontic / irrealis *ka*. We have argued that each of these modals involves a presupposition which restricts the conversational background. We have further argued that the apparently variable quantificational force of each of the modals can be uniformly accounted for using a free choice-function variable which picks out a (possibly proper) subset of accessible worlds. In this section we extend and apply our analysis to two other St’át’imcets modals.

The two additional modals discussed here are both evidentials: *-an*, ‘epistemic-perceived evidence’, and *ku7*, ‘epistemic-reportative’.<sup>29</sup> An example of the use of each is given in (67) and (68), respectively.

- (67) pel’p-s-ácw-**an**<sup>30</sup>                      nelh    neklíh-sw-a  
 lost-CAUS-2SG.CONJ-**PERC.EVID**    DET.PL key-2SG.POSS-DET  
 ‘It looks like you’ve lost your keys.’                      (Davis in prep. chapter 23)

- (68) wa7    **ku7**                      ku    sts’éts’qwaz’    l-ta    stswáw’cw-a  
 be    **REPORT**                      DET    trout                      in-DET creek-DET  
 ‘[I heard] There are trout in the creek.’

In this section we will first discuss the presuppositions of *-an* and *ku7* (section 4.1), then their quantificational force (section 4.2), and then provide the analysis (section 4.3). We will also slightly revise the semantics given for *k’a* in section 3 above. Parts of this section are shortened versions of discussion in Matthewson, Rullmann and Davis (2006); the reader is referred to that work for detailed arguments that *-an* and *ku7* are epistemic modals rather than illocutionary operators.

##### 4.1 Presuppositions of indirect evidence

In this section we show that *-an* carries a presupposition that there is perceived indirect evidence for the assertion, while *ku7* carries a presupposition that the source of the evidence for the assertion is by report.

<sup>29</sup> van Eijk’s (1997) terms for these elements are ‘evidential’ and ‘quotative’ respectively.

<sup>30</sup> *-an* differs morphosyntactically from the other modal enclitics in two ways. It obligatorily induces conjunctive morphology on the predicate; and it precedes rather than follows the existential enclitic *-a* which occurs with existence-asserting determiners, as well as the homophonous suffix *-a* which forms part of the discontinuous ‘out-of-control’ morpheme. The latter accounts for the orthographic convention whereby *-an* is written together with the preceding word, whereas *k’a* and *ku7* are written as separate words, even though all three are enclitics. We set these issues aside here, since they are irrelevant to the present analysis.

First let us look at *-an'*. Davis (in prep.: chapter 23) observes that *-an'* ‘refers to a situation where the speaker has come to a conclusion about the truth of an event on the basis of appearances.’ Thus, this clitic falls under Willett’s (1988) category ‘inference from results’, defined as when the speaker ‘infers the situation described from the observable evidence (i.e. from *perception* of the results of the causing event or action)’ (Willett 1988:96; emphasis added). In this respect *-an'* contrasts with epistemic-inferential *k'a*, which does not specify whether the inference is based on observable results or solely on reasoning. Thus, *-an'* is felicitous in a subset of cases in which *k'a* is appropriate. This is illustrated in (69-70). In (69), there is no observable evidence; the assertion is based only on reasoning, and only *k'a* is good. In (70), there *is* observable evidence, and both *k'a* and *-an'* are good.<sup>31</sup>

(69) *Context: You had five pieces of ts'wan (wind-dried salmon) left when you checked yesterday. Today, you go to get some ts'wan to make soup and you notice they are all gone. You are not sure who took them, but you know that John is the person in your household who really loves ts'wan and usually eats lots whenever he gets a chance.*

- a.    ts'aqw-an'-ás **k'a**    i       ts'wán-a                   kw    s-John  
       eat-DIR-3ERG **INFER** DET.PL wind-dried.salmon-DET    DET   NOM-John  
       ‘John must have eaten the *ts'wan*.’
- b. ?? ts'aqw-an'-ás-**an'**                   i       ts'wán-a                   kw    s-John  
       eat-DIR-3ERG-**PERC.EVID**    DET.PL wind-dr.salmon-DET    DET   NOM-John  
       ‘John apparently ate the *ts'wan*.’

Consultant’s comment re (b): “[It’s good] if he has bits of *ts'wan* on his shirt.”

(70) *Context: Same as in (69), except that this time, it’s not just that you think it must be John because he’s the one who likes ts'wan. This time, you see the ts'wan skins in his room.*

[69a]: good  
 [69b]: good

These data support our claim that for *-an'*, there must be perceived evidence for the modal assertion, while with *k'a*, this is not required.

Now let us turn to reportative *ku7*. A sentence of the form *ku7*  $\varphi$  is felicitous whenever the speaker came to believe that  $\varphi$  is possibly or necessarily true based on a report from some other person. Some examples are given in (71-73); these show that *ku7* is felicitous in Willett’s three reportative contexts of second-hand, third-hand, and folklore respectively.

<sup>31</sup> The examples in (69-70) are adapted from similar data presented in Bulgarian by Izvorski (1997).







(84) *Context: There is a rumour going around that Roger was elected chief. Sometimes that kind of rumour is right, sometimes it's wrong. You really have no idea whether it's likely to be right or wrong. You tell me:*

%	aw-an-ém	<b>ku7</b>	kw	s-Roger	ku	cuz'	kúkwi7
	choose-DIR-PASS	<b>REPORT</b>	DET	NOM-Roger	DET	going.to	chief
	'[I was told] Roger was elected to be chief.'						

Situations similar to (84) are discussed by Faller (2002) as being test cases for the quantificational force of a reportative modal. Faller notes (2002:109) that if the reliability of the source is unknown, only an existential analysis predicts a reportative sentence to be true. The reason is that if the reliability of a source is unknown (e.g., if it is a rumour), then the set of worlds in which that report is heard will include both worlds where the report is true, and worlds where the report is false. A universal quantification over the report worlds will be false. The fact that some speakers accept (84) therefore provides some limited support for the claim that just like all the other modals, *ku7* is acceptable in contexts supporting only existential quantification.

### 4.3 Analysis of *ku7* and *an'* (and a revised analysis of *k'a*)

The analysis we gave in section 3 can be extended to the other two evidentials discussed here, with the presuppositions tailored to the specific type of indirect evidence that each clitic requires. First we will refine the analysis of *k'a*, as in (85).

#### (85) **Semantics of *k'a* (inferential)**

$[[k'a(f)(B)(w)(\phi)]]$  is only defined if for all worlds  $w'$ ,  $w' \in B(w)$  iff the inferential evidence in  $w$  holds in  $w'$ , and  $f$  is a choice function of type  $\langle st, st \rangle$  such that  $f(B(w)) \subseteq B(w)$ .

If defined,  $[[k'a(f)(B)(w)(\phi)]] = 1$  iff for  $\forall w' \in f(B(w))$ :  $[[\phi(w')]] = 1$ .

A parallel analysis of *-an'* is given in (86).

#### (86) **Semantics of *-an'* (perceived-evidence)**

$[[ -an'(f)(B)(w)(\phi) ]]$  is only defined if for all worlds  $w'$ ,  $w' \in B(w)$  iff the perceived evidence in  $w$  holds in  $w'$ , and  $f$  is a choice function of type  $\langle st, st \rangle$  such that  $f(B(w)) \subseteq B(w)$ .

If defined,  $[[ -an'(f)(B)(w)(\phi) ]]$  = 1 iff for  $\forall w' \in f(B(w))$ :  $[[\phi(w')]] = 1$ .

Now we turn to the reportative. As with the other evidentials, the accessible worlds must be those in which some actual-world evidence holds. In a reportative case, the speaker's evidence for the assertion is the fact that a report was made. Therefore, the accessible worlds are all those worlds in which a certain report was made. This is shown in (87).

(87) **Semantics of *ku7* (reportative)**

$[[ku7(f)(B)(w)(\phi)]]$  is only defined if for all worlds  $w'$ ,  $w' \in B(w)$  iff the reported evidence in  $w$  holds in  $w'$ , and  $f$  is a choice function of type  $\langle st, st \rangle$  such that  $f(B(w)) \subseteq B(w)$ .

If defined,  $[[ku7(f)(B)(w)(\phi)]] = 1$  iff for  $\forall w' \in f(B(w))$ :  $[[\phi(w')]] = 1$ .

Above we noted that *-an'* and *ku7* strongly prefer a universal interpretation. In section 3.3 we speculated that there is general default preference for universal readings of modals in St'át'imcets because the choice function  $f$  is by default interpreted as the identity function. We do not know why this preference would be even stronger for *-an'* and *ku7* than it is for *k'a* and the other modals, and leave this as another question for further research.

## 5. Conclusion

With our analysis of the St'át'imcets modals in place, in this final section we return to the major semantic differences between the English and St'át'imcets modal systems, and to the question of what kind of parameters we might need to define those differences.

There are two principal areas of variation. The first is the specification of quantificational force, the second the specification of the modal base/accessibility relation. To put it briefly, English modal auxiliaries seem to lexically specify quantificational force (universal versus existential) but leave the modal base unspecified, whereas St'át'imcets modal enclitics apparently do the reverse: as we have seen, they have variable quantificational force, but are selective about which modal base they choose.

For expository purposes, we will first deal with these differences separately, before returning to the question of whether and how they might be linked.

### 5.1 Differences in quantificational force

Recall that under the classical analysis of English modals, each modal is lexically specified as either an existential or a universal quantifier over possible worlds. However, under our analysis of modals in St'át'imcets, all modals are specific indefinites, with varying quantificational force, depending on the range of the choice function  $f$  in the formula in (54), repeated below:

(54) *St'át'imcets modals*

$[[ \text{MODAL}(f)(B)(w)(\phi) ]]$  = 1 iff  $\forall w' \in f(B(w))$ :  $[[\phi(w')]] = 1$

Though superficially quite different from the classical approach, our analysis can be extended rather straightforwardly to English modals. English modals with universal force (e.g., *must*, *should*, and *will*) will treat  $f$  as the identity function, which will then pick out the entire modal base:

(88) *English 'strong' modals*

$[[ \text{MODAL}(f)(B)(w)(\phi) ]]$  is only defined if  $\forall A$ ,  $f(A) = A$ .

If defined,  $[[ \text{MODAL}(f)(B)(w)(\phi) ]]$  = 1 iff  $\forall w' \in f(B(w))$ :  $[[\phi(w')]] = 1$

‘Weak’ (existential) modals in English can then be treated as identical in meaning to St’át’imcets modals (i.e., with the interpretation in (54)). Since propositions containing strong modals asymmetrically entail propositions containing the corresponding weak modals, we can arrange them on a Horn Scale (Horn 1972, 1989):

- (89) *must* > *may*  
*will* > *might*  
*would* > *could*  
 etc.

Since the strong modals are lexically specified as universal via the identity function in (88), the ‘weak’ modals (which do not specify the value of *f*) will be pragmatically coerced into showing existential behaviour by the Gricean Maxim of Quantity, without any further stipulation. In contrast, since St’át’imcets has only one class of modals, it will lack a Horn Scale, and, as we have already observed, will therefore show variable quantificational force.

Supporting data for the contention that weak readings of English modals come about through conversational implicature is provided by examples such as those in (90), where the implicature is explicitly cancelled:

- (90) a. He could have gone – in fact, he must have gone.  
 b. He can go – in fact, he should go.  
 c. It might have happened like that – in fact, it must have happened like that.  
 d. It may turn out like that – in fact, it will turn out like that.

Moreover, weak modals in English sometimes show universal force even when there is no explicit cancellation of the implicature.

- (91) The fuse box can/may be accessed via the passenger’s glove compartment.  
 (In fact, this is the only way to get at it.)

According to our account, then, the differences in quantificational force between modals in St’át’imcets and English can be reduced to one simple lexical distinction: one class of English modals is specified as ‘strong’ by treating the choice function over the modal base as an identity function.

## 5.2 Differences in modal base

The second major difference between the English and St’át’imcets modal systems lies in the selection of the modal base/accessibility relation. Here, as we have seen, English is less selective than St’át’imcets. All English modals can be used with deontic, epistemic, or circumstantial bases, as exemplified with *must* in (92a-c), respectively:

- (92) a. You must leave now.  
 b. He must have left by now.  
 c. We must all die.

In contrast, St'át'imcets uses three different modals for these three different modal bases, as shown in the St'át'imcets translations for (92).

- (93) a. qwatsáts-kacw      **ka**      lhkunsa  
 leave-2SG.SUBJ      **DEON**      now  
 'You must leave now.'
- b. plan      **k'a**      tu7      qwatsáts  
 already      **INFER**      then      leave  
 'He must have left by now.'
- c. takem-lhkálh      **kelh**      t'u7      zuqw  
 all-1PL.SUBJ      **FUT**      just      die  
 'We must all die.'

Furthermore, within the category of epistemic modals, St'át'imcets makes distinctions that are simply absent in English: the three evidentials *k'a*, *-an'*, and *ku7* each pick out a different source of speaker knowledge (though that selected by *-an'* is a subset of that selected by *k'a*). Modals in English simply fail to make evidential distinctions altogether.

### 5.3 Are the differences linked?

We have seen that English and St'át'imcets modals differ along two complementary dimensions. On the one hand, English modals partially specify quantificational force, while their St'át'imcets counterparts do not; on the other hand, St'át'imcets modals make fine-grained distinctions between different modal bases, whereas their English counterparts are unselective in this respect. The obvious question to ask, given this apparent complementarity, is whether the two dimensions are inherently linked. Note that nothing in the analysis we have provided predicts such a link; and in fact, it is impossible to tell without a much larger sample of languages whether the complementarity is accidental or systematic. Since it is beyond the scope of this paper to undertake anything like a comprehensive cross-linguistic survey of modal systems, we will confine ourselves here to some brief remarks on general trends in the typological literature, together with some pointers on the specific kind of evidence that are relevant to resolving the question.

Let us begin by making clear what an inverse correlation between the specification of quantificational force and the specification of the modal base predicts. If such a correlation is cross-linguistically valid, the empty cells in the table below should remain blank.

(94)

	<i>selective modal base</i>	<i>unselective modal base</i>
<i>specified force</i>	?	<i>English</i>
<i>unspecified force</i>	<b>St'át'imcets</b>	?

Notice that the two empty cells differ in status. The upper left hand cell, if filled, would contain ‘overspecified’ modals which lexically encode both force and modal base; the bottom right hand cell, in contrast, would contain ‘underspecified’ modals which make no distinctions in either dimension. Since it is hard to tell what a completely undifferentiated modal (or modal system) would look like, aside from possibly encoding a realis versus irrealis distinction, we will focus our attention here on the possible existence of the ‘overspecified’ modals/modal systems in the upper left hand cell.

Note further that we can construe the complementarity hypothesis in either a ‘strong’ or a ‘weak’ way. The strong version (as applied to overspecified modals) would claim that no modal *system* ever includes both elements which specify force and elements which select for particular modal bases; the weaker version claims that no individual modal *element* is ever specified for both.

Unfortunately, however, it is not easy to extract the relevant information from the typological literature on modals and modal systems. There are two reasons for this. The first is an over-riding cross-linguistic generalization, aptly expressed by Chung and Timberlake (1985: 242): ‘if we exclude modal auxiliaries, particular languages tend to be less concerned with distinguishing necessity from possibility than with distinguishing different types of possibility.’ In other words, outside of European modal systems, the classic ‘logical’ division between universal and existential quantification over possible worlds is very scantily attested. This means that the top row of the table in (94) actually contains very few modal systems, irrespective of the selectivity of the modal base.

The second reason is that the cross-linguistic investigation of modal force (to the extent it has been studied at all) has largely been explored independently of the cross-linguistic investigation of the modal base. In fact, even when the connection between the two has been explicitly recognized in the typological literature, the decision has still often been made to treat them separately. For example, Bybee and Fleischman (1995:4) note in the introduction to the volume which they edited on the cross-linguistic expression of modality that

...as applied to natural language, there is no reason to restrict the epistemic notion just to necessity and possibility, as is traditional in philosophy of language. For one thing, commitment to the truth of a proposition is often a matter of degree. For another, epistemic modality can be seen as overlapping with, or even encompassing another grammatical category, namely evidentiality.

Obviously, we are in substantial agreement with the sentiments expressed here; indeed, one of the goals of the current paper is to establish the connection between epistemic modality and evidentiality. Yet Bybee and Fleischman subsequently make the tactical decision to *exclude* the study of evidentiality from the papers in the rest of the volume, thereby effectively short-circuiting further discussion of the connection.

The same problem – from the opposite direction - affects much of the rapidly expanding typological literature on evidential systems (see for example Chafe and Nicholls 1986, Willet 1988, Aikhenvald 2004, and references therein). Work in this genre has focused on classifying types of evidence, and has – with certain notable exceptions – generally neglected the question of how evidentials are to be represented formally. In fact, it has only been recognized recently that evidentials in different languages (and even different evidentials in the same language) may have

quite different formal semantics: see in particular Faller (2002) on speech-act as opposed to modal evidentials in Quechua. Since the differences between the two types are subtle, this makes it difficult even to delimit a set of ‘modal evidentials’ cross-linguistically to act as a comparison class.

Finally, elements with both evidential and modal meaning are often subsumed within the category of grammatical *mood*, which involves paradigmatically opposed sets of clause-level inflectional marking, as opposed to individual markers of modal force or modal base. Mood paradigms usually involve complex amalgams of syntactic and semantic features, including speech act distinctions (declarative versus interrogative versus imperative), evidentiality (quotative, inferential), deontic notions (obligative), specifications of modal force (dubitative, assertative), as well as purely syntactic information such as the status of a clause as independent or dependent. See Mithun (1999) for a brief but excellent discussion of mood paradigms in North American languages.<sup>33</sup> See also Portner (1997) for a possible-worlds analysis of (notional) mood which in certain ways is similar to our treatment of modals in St’át’imcets.

More broadly, it is fair to say that the morphosyntactic expression of modality (including both modal force and modal base) is extremely heterogeneous cross-linguistically. Modal elements may be main predicates, adverbs, auxiliaries, clitics or affixes: they may be fused inflectionally with person markers or tense/aspect markers (or both); and different modals may have different syntactic properties in the same language. The same is largely true of evidential markers (though see Aikhenvald 2004 for an attempt to define a morphologically distinct class of evidentials, and – from quite a different tradition – Cinque 1999, who attempts to assign evidentials to particular positions in a universal hierarchy of functional projections).

Given these obstacles, it is impossible to provide more than educated guesses on the status of the inverse force-base correlation. Nevertheless, it is possible to say with some confidence that the strong version of the complementarity hypothesis is false. There are certainly languages (e.g., Hanis Coos, as cited by Mithun 1999:182) which appear to group force-specifying and evidential (modal base-specifying) particles together: in the former group, we can include those glossed as ‘maybe’, ‘I doubt’, and ‘surely, certainly’; in the latter group we find typical evidentials such as ‘knowledge by evidence’ and ‘hearsay’.

The weaker version of the complementarity hypothesis is harder to evaluate. Is a ‘dubitative’ marker, for example, to be classified as an indicator of quantificational force, a specification of the modal base, both, or neither? There is really no a priori answer to this question, which can only be properly answered through more detailed semantic investigation. The best that we can say is that we have not yet come across any pairs of modal elements with meanings like ‘definitely true, on the basis of inference’ versus ‘possibly true, on the basis of inference’.

We conclude that the literature does not in its current state afford data of sufficient semantic depth or subtlety to be able to evaluate the validity of the inverse correlation between the specification of quantificational force and the selectivity of the modal base. Since the correlation is simply an observation at this point, and does not follow from our analysis, this has no impact on our theoretical treatment of modality in St’át’imcets (or English). Nonetheless, it is clear that future cross-linguistic work on the topic should address the range of possible modal meanings in a more systematic, theoretically refined and empirically detailed fashion – a task

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<sup>33</sup> Unfortunately, elements of mood paradigms are frequently referred to as ‘modals’, leading to further terminological confusion.

begun in exemplary fashion by Faller (2002), and to which we hope to have contributed in this paper.

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