

Lack of Epistemic Necessity Modals in Atayal

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Outline

- Research context
- Modality in Atayal
- On the absence of epistemic necessity modals
- Analysis
- Implications

Research Context

Modals are quantifiers

- Modals are quantifiers (\forall / \exists) over possible worlds.
- **Quantificational strength (also, modal force)**

Strength	Examples	Quantifier
Necessity	<i>must, have/ought to</i>	Universal (\forall)
Possibility	<i>may, might, can</i>	Existential (\exists)

- (a) You **must** stay, but also, you **must** leave. (leave = not stay). [contradictory]
- (b) You **may** stay, but also, you **may** leave. [consistent]

- Other possibilities of quantificational strength:
 - Weak necessity, e.g., *should* (cf. Copley 2006; von Stechow and Iatridou 2008)
 - Variable quantificational strength (cf. Rullmann et al. 2008)
 - Gradable modals (cf. Kratzer 2009, 2012)

Flavors of modality

Epistemic vs. circumstantial (= non-epistemic/root) modality

Kratzer (1991):

- (a) Hydrangeas **could** grow here. [based on relevant facts]
- (b) There **might** be hydrangeas growing here. [based on knowledge or evidence]

- In a situation where we know there are currently no hydrangeas here but the climate and the soil are such that hydrangeas would have a change of growing here, (a) is true whereas (b) is false.
- **Contingency** on the evaluation world: We only consider possible worlds compatible with evidence/facts in the actual world.

Flavors of modality

Semantic classifications

This work	Epistemic	Deontic	Bouletic	Teleological	Pure Circumstantial	Ability	Volitional
Traditional	Epistemic	Deontic				Dynamic	
van der Auwera & Plungian 1998	Epistemic	Participant-external				Participant-internal	
Hacquard 2006	Epistemic	Deontic	Goal-oriented			Ability	
Portner 2009	Epistemic	Priority				Dynamic	

- Illustration of the classification with *have to* (von Stechow 2006:2):
 - (a) It **has to** be raining. [after observing people coming inside with wet umbrellas; **epistemic**]
 - (b) Visitors **have to** leave by six pm. [hospital regulations; **deontic**]
 - (c) You **have to** go to bed in ten minutes. [stern father; **bouletic**]
 - (d) To get home in time, you **have to** take a taxi. [**teleological**]
 - (e) I **have to** sneeze. [given the current state of ones nose; **pure circumstantial**]

Flavors of modality

Conversational backgrounds

Uses of modals (i.e. Modal flavors) are determined by *conversational backgrounds* (Kratzer 1981, 1991)

- A **modal base** *determines for every world the set of worlds which are accessible from it*
- An **ordering source** *induces an ordering on the set of worlds accessible from that world*

Modal Base	Epistemic	Circumstantial			
Ordering Source	Stereotypical	Deontic	Bouletic	Teleological	Pure circumstantial

Jane must go to bed at 9:00 pm.

‘In all of the possible worlds in which Jane’s parents’ orders are obeyed, Jane goes to bed at 9:00.’

N.B. The actual world is not necessarily one of the accessible worlds; Jane may be a very disobedient girl in reality and never go to bed at 9. However, this sentence is still judged to be true.

Language variations

- Conversational backgrounds can be restricted by context (Kratzer 1981, 1991) as in the case of English.
- Languages may vary in whether they have a **contextually given** or **lexicalized** conversational backgrounds and/or modal force (Rullmann et al. 2008).
- Two parameters: **modal base/ordering source**, and **modal force**

Type 1: Flexible modal base

English	Epistemic	Circumstantial
Necessity	<i>must</i>	
Possibility	<i>may</i>	

Type 2: Flexible modal force

St'át'imcets	Epistemic	Circumstantial
Necessity	<i>k'a, -an', ku7</i>	<i>ka</i>
Possibility		

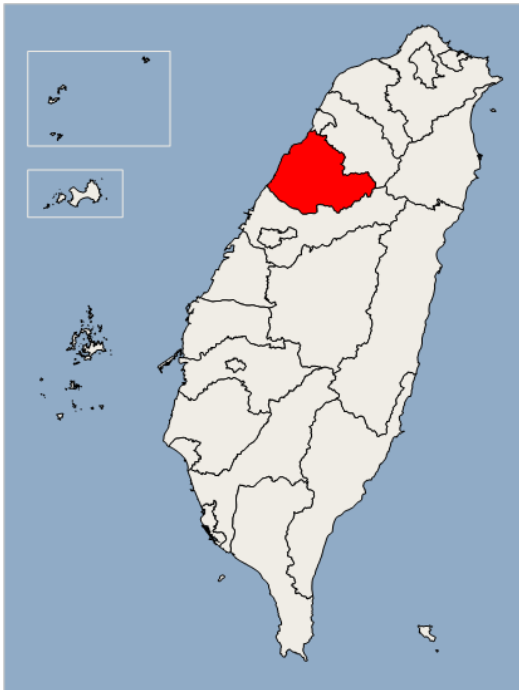
Modality in Atayal

	Epistemic	Circumstantial
Universal	A	B
Existential	C	D

Atayal (Atayalic)

- Two major dialects: Squliq and C'uli', spoken in northern Taiwan
- The data collected in this paper are based on fieldwork from Squliq spoken in Hsinchu and Mayrinax, a variant of C'uli' spoken in Miaoli. I'll be illustrating with Squliq data.
- 4-way voice inflection: **A**(ctor)**V**, **P**(atient)**V**, **L**(ocative)**V**, **B**(eneficiary)**V**
- V-(O)-S_{ABS} (Antipassive = AV) and V-S_{ERG}-O_{ABS} (Ergative = Non-AV)

Miaoli



Hsinchu



Fieldwork methodology

Semantic fieldwork (Matthewson 2004, 2011):

- Felicity judgment tasks: Speakers judge the felicity of a sentence given a context.
- Elicited production tasks: Speakers volunteers sentences appropriate in the context.
- Volunteered comments: Speakers may offer comments that provide clues about their reasons for rejecting a sentence.

Storyboards (Burton and Matthewson 2015): Speakers tell a story based on a set of pictorial slides in their own language after the fieldworker has told the story in the contact language (www.totemfieldstoryboards.org).

ki'a is an epistemic possibility modal

***ki'a* is only compatible with possibility, rather than necessity, contexts.**

- 1) Context: *Tali and Rimuy run to an old abandoned cottage and hide there. Then the police find the cabin, where there are several places to hide, and wonder where Tali and Rimuy could be.* ('On the Lam', TFS Working Group 2011)

ki'a wal tlqing kuru' la.
EPIS.POS PFV hide.AV box PRT
'They might have hidden in the box.'

- 2) Context: *(There are only three possible hiding places) "They can't be hiding in the box", says the policeman. "It's too small. And they can't be hiding under the bed. It's too low."* ('On the Lam', TFS Working Group 2011)

ki'a cyux tlqing suruw na pala qniway tubung.
EPIS.POS PROG hide.AV back GEN cloth cover window
'They might be hiding behind the curtain.'

ki'a is an epistemic possibility modal

ki'a is incompatible with non-epistemic contexts.

- 3) Context: *You acquire a new piece of land and discover that the soil and climate are such that persimmons would have a chance of growing here although you know that there are currently no persimmons here.* (adapted from Kratzer 1991: 646)

musa' *blaq* pmhi-un sqani qapu'. / # *ki'a* ...
FUT *CIRC.POS* plant-PV here Persimmon *EPIS.POS*
'Persimmons can be planted here.'

- 4) Context: *Your child asks your permission to go out. You say:*

nway=su m-usa' g<m>naw. / # *ki'a* ...
DEON.POS=2S.ABS AV-go play<AV> *EPIS.POS*
'You can go to play.'

blaq and *nway* are circumstantial possibility modals

Both are incompatible with necessity contexts.

- 5) Context: *According to the traffic safety code, people must wear a safety helmet when riding a motorcycle.*

m_{luw} utubay ga, siki si p-qbubu' qbubu'. / # ... *blaq/nway* ...
ride.AV motorcycle TOP CIRC.NEC SI VZR-hat hat CIRC.POS/DEON.POS
'To ride a motorcycle, you must wear a helmet.'

Both are incompatible with epistemic contexts.

- 6) (= 1) Context: *Tali and Rimuy run to an old abandoned cottage and hide there. Then the police find the cabin, where there are several places to hide, and wonder where Tali and Rimuy could be. ('On the Lam', TFS Working Group 2011)*

ki'a wal tlqing kuru' la. / # *blaq/nway* ...
EPIS.POS PFV hide.AV box PRT CIRC.POS/DEON.POS
'They might have hidden in the box.'

blaq and *nway* encode different subtypes of circumstantial possibility

Both *blaq* and *nway* are compatible with deontic contexts.

7) Context: *Only vehicles with a license can legally carry passengers.*

bali takusi p-hakut squliq. baha **blaq** h<m>akut=ta'
NEG.IRR taxi CAU.AV-carry people how.come **CIRC.POS** carry<AV>=1P.ABS
okyak lpi?
guest PRT

'It's not the taxi that carries people. How can we carry passengers?'

8) Context: *Only family members are allowed to enter the patient's room during visiting hours, but you're allowed since you are a really close friend.*

nway=su wah-an m-ita'.
DEON.POS=2S.ERG come-LV AV-see
'You can come to see him.'

blaq and *nway* encode different subtypes of circumstantial possibility

While *blaq* is also compatible with the other subtypes, *nway* is not.

- 9) Context: *Someone wants to visit that tribe in the mountain and asks you which road he can take. You answer:*

musa' *blaq* pwah sa tuqi qani.
FUT *CIRC.POS* pass.AV LOC road this
'You can go this way.'

#*nway*=su' pwah sa tuqi qani.
CIRC.POS=1S.ABS pass.AV LOC road this
'You can go this way.'
Comment: (Laughing) "This means the road belongs to you."

- 10) Context: *Mother bought a basket of very delicious taros. Since I know you like taros very much, I recommend you to taste them.*

musa' *blaq* tlam-an=su cikay.
FUT *CIRC.POS* taste-LV=1S.ERG little
'You can try a bit.'

#*nway*=su' tlam-an cikay.
CIRC.POS=2S.ERG try-LV little
'You can try a bit.'

- 11) Context: *persimmons' glowing*

musa' *blaq* pmhi-un s-qani qapu'.
FUT *CIRC.POS* plant-PV LOC-here persimmon
'Persimmons can be planted here.'

#*nway*=su' pmhi-un sqani.
CIRC.POS=2S.ERG plant-PV here
'You can plant (persimmons) here.'
Comment: "It's okay if you don't hinder my farming."

siki is a circumstantial necessity modal

***siki* is incompatible with epistemic contexts.**

- 12) Context: *(There are only three possible hiding places) “They can’t be hiding in the box”, says the policeman. “It’s too small. And they can’t be hiding under the bed. It’s too low.”* (‘On the Lam’, TFS Working Group 2011)

*si baq-i sa cyux tlqing suruw na pala qniway tubung. / # **siki**...*

SI know-DEP.PV SA PFV hide.AV back GEN cloth cover window **CIRC.NEC**

‘I am sure that they are hiding behind the curtain.’

Conjoining *siki*(P) and *siki*(~P) induces a contradiction:

- 13) # **siki** m-aki’ kya’ ga, **siki** pyar-an uzi’.

CIRC.NEC AV-live there TOP **CIRC.NEC** escape-LV also

#‘You must stay here, but you must also leave.’

Comment: “Do you think this makes sense?”

siki is a circumstantial necessity modal

***siki* is compatible with all subtypes of circumstantial contexts.**

14) Context: *There's only one road to that tribe.*

m-usa'=su' mita' qalang qasa ga, *siki* pwah tuqi sqani.
AV-go=2S.ABS see.AV tribe that TOP *CIRC.NEC* pass.AV road this
'For your going to see that tribe, (you) have to go this way.'

15) nanu' yan qani k<in>blaq=su niq-un sayhuy ga, *siki* si=su'
what like this NML<PFV>good=2SG eat-PV taro TOP *CIRC.NEC* SI=2S.ERG
tlam-i balay qutux qanihya' ha!
taste-DEP.LV truly one this EMP PRT
'For your loving of eating taros, you have to taste this one!'

16) ungat qu uglgan=myan sraral hga, *siki* si=sami phkangi.
exist.NEG ABS transportation=1PG before TOP *CIRC.NEC* SI=1P.ABS walk.DEP.AV
'Our transportation was none before, so we had to walk.'

Ability: *baq* vs. *thuzay*

***baq* and *thuzay* encode mental and physical ability of the agent respectively** (cf. Pitay 2014); both uses may extend beyond pure ability.

- Context: *asking the ability of playing the instrument*

(17) *baq*=saku' tlubuw hamunika.

ABL.AV=1S.ABS play.AV harmonica

'I can play the harmonica.'

Comment: "You know how to play the harmonica."

(18) *thuyay*=ku' tlubuw hamunika.

ABL.AV=1S.ABS play.AV harmonica

'I can play the harmonica.'

Comment 1: "You already learnt how to play the harmonica but you might have gotten sick and couldn't play it for a while; you say this because you can play it now."

Comment 2: "You are old but you are able to play the harmonica."

Summary

Atayal modal system

Force \ MB \ OS	Epistemic	Circumstantial			
	Stereotypical	Deontic	Teleological	Bouletic	Pure/empty
Necessity	?	<i>siki</i>			
Possibility	<i>ki'a</i>	<i>blaq</i>			
		<i>nway</i>			

- Atayal lexically encodes *types of modality* and *quantificational strength*.
- Circumstantial possibility modals are lexicalized in terms of types of ordering source.
- Ability modals lexically vary with mental/physical status of subject.
 - I put aside the modal force of abilities relating agentivity (cf. Kenny 1976, Brown 1988, Hackl 1998, a.o.); I simply assume Kratzer's Good Possibility (cf. Portner 2009: 202).
- **There's no lexical epistemic necessity modal.**

A brief comparison of two dialects

- Squliq dialect

MB	Epistemic	Circumstantial			
OS	Stereotypical	Deontic	Teleological	Bouletic	pure
Necessity	?	<i>siki</i>			
Possibility	<i>ki'a</i>	<i>blaq</i>			
		<i>nway</i>			

- Mayrinax, C'uli' dialect (also cf. Wu 2013, Cheng 2013)

MB	Epistemic	Circumstantial			
OS	Stereotypical	Deontic	Teleological	Bouletic	pure
Necessity	?	<i>asi ki</i>			
Possibility	<i>ki'a</i>	<i>balaig</i>			
		<i>hanu'an</i>			

Lack of epistemic necessity modals

	Epistemic	Circumstantial
Necessity		B
Possibility	C	D

Supporting evidence

- **Speakers' feedback in fieldwork**

- Indicating no correspondent word in Atayal
- No one single and the same form were offered

Approximates: (a) indicative paraphrases, (b) *si baqi sa* 'it is surely known that ...',
(c) emphatic adverb (w/ or w/t the possibility epistemic modal *ki'a*)

(19) Context: *You know that if Temu is at home, his light is always on, and if he's out the light is off. You see the light on tonight.*

(a): cyux maki' ngasal **balay** temu hya'.
PROG be.AV house truly Temu PRT
'Temu is truly at home.'

(b): **si baq-i** **sa** cyux maki' ngasal temu hya'.
SI know-DEP.PV SA PROG be.AV house Temu PRT
'That Temu is at home is for sure.'

[Similar facts found in Mayrinax Atayal]

Supporting evidence

- No logically stronger quantifier intrudes the same domain

ki'a ONLY allows for possibility force in downward-entailing contexts; tests in Deal (2011):

- If the restriction to possibility interpretations were only an implicature, that implicature should disappear in DE contexts, as scalar implicatures do.

'I know some of the students' implies 'I don't know all of the students'

'If you see some of the students, ...' doesn't imply 'If you see some but not all of the students, ...'

Negation's scope

(20) Context: *Your brother brings a raincoat with him because he thinks it might rain today.*

But you say:

bali **ki'a** p-qwalax.

NEG **EPIS.POS** FUT.AV-rain

'(I assume you think it might rain but) it will not rain.'

Comment: "It's very sunny. You can guarantee it won't rain."

Universal quantifier's restriction

(21) nyux=maku' bzir-un kwara' qu **ki'a**=su' blaq niq-un ka baybway.

'I've bought every fruits that you **might/#should** like to eat.'

[Similar facts found in Mayrinax Atayal]

Summary again

- **Atayal has an asymmetrical modal system: modals are lexically specified for modal flavour and modal force**
- **There is a *lexical gap* in the epistemic necessity domain.**

Analysis

Deal (2011) proposes that modals without duals do not have scales and thus allow flexible strength.

	modals with scales			modals without scales	
Inventory	◇, □	◇ (<i>ki'a</i>)	□	◇ (<i>o'qa</i>)	□
Language	English	Atayal		Nez Perce	St'át'imcets
UE	inflexible	inflexible		flexible	inflexible*
DE	inflexible	inflexible		inflexible	?

- **Under this approach, the epistemic modal *ki'a* is a modal without duals but with scales.**

I propose that *ki'a* is an existential quantifier with presupposition of epistemic MB:

[[*ki'a*]]^{w,g} is only defined if *g* provides an epistemic modal base *f*.

If defined, [[*ki'a*]]^{w,g} = λf. λh . λp. ∃ w' [w' ∈ BEST_{h(w)}(∩f(w)) & p(w')]

- **This suggests that languages may vary in what enters as duals on a Horn scale.**

Atayal: < *ki'a*, indicative clause/emphatic adverb/periphrastic phrase >

Nez Perce: < *o'qa* >

English: < *may, must* >

*contra to what is predicted by Deal

Implications

Cross-linguistic typology of modality system

- A typology established in previous work (Rullmann et al. 2008, Vander Klok 2013, Chen 2014, Louie 2015, Bochnak 2015):

		Conversational Background	
		<i>lexically specified</i>	contextual
Quantificational Force	<i>lexically specified</i>	Javanese, Mandarin, Blackfoot	English
	contextual	St'át'imcets	Washo

- What does Atayal's modal system tell us?

Modal systems attested in languages are far more complex (cf. Menzies 2013, Matthewson 2013).

- Particular modals, rather than a whole system, vary in which of the two parameters is lexically specified (contra van der Auwera & Ammann 2013; cf. Matthewson 2013, Davis et al. 2014).
- Languages may lack modals in a certain space of their system.

Conclusions

- Atayal contributes to uncovering the diversity in how the world's languages express modality.
- There is a great need for semantically motivated descriptions of modal systems.

Thank you!