1 Overview

• Do sentences with future marking like (1) make a temporal or a modal claim?

(1) It will rain tomorrow.

• Both claims made for English but modal semantics more dominant.

  – Temporal: A claim about what happens at a certain — actual — point in the linear continuation of time, comparable to claim about past.

  – Modal: A claim about what happens across a number of possible futures.

• One class of evidence for linking modality with futurity is that future markers seem to have modal meanings in some languages (and vice versa).

• Epistemic (belief-oriented) use of English future: future temporality seems to be missing in (2-b).

(2) Context: Your colleague asks you where Ted is. You know that his schedule says he is in the library at the moment.

  a. He will be in the library now. Epistemic future
  b. He must be in the library now. Epistemic modal ‘must’

1Unless otherwise cited, all Navajo data presented comes from original fieldwork conducted between 2013 and 2015. For their patience and insight, I thank Ellavina Perkins, Leroy Morgan, Johnny Harvey, Irene T sosie, Louise Kerley, and Louise Ramone. This work has benefited from discussion with Rajesh Bhatt, Keir Moulton, Seth Cable, Angelika Kratzer, Peggy Speas, and audiences at the University of British Columbia and Simon Fraser University. Funding for this research came from an NSF Doctoral Dissertation Research Improvement Grant ([#BCS-1451265]). Any remaining error are my own.

2But see Bennett and Partee (1978) for discussion of how futurity can still be involved.
• There are a number of crosslinguistic examples of markers that encode future temporality also permitting certain meanings associated with modals.\textsuperscript{3}

• **Cappadocian Greek**: Condoravdi (2003) cites epistemic and deontic (rule-oriented) \((3)\) uses of the Cappadocian Greek future \((na)\):

\begin{quote}
(3) to ḥah as karj z na t agapis.
the child from heart yours FUT it love.2SUBJ
‘You must love the child from your heart.’ \((\text{Condoravdi 2003: (7)})\)
\end{quote}

• Other languages where futurity overlaps with modal expressions:

  – **Paraguayan Guaraní** (Tonhauser 2011)
  – **St’át’imcets** (Matthewson 2006)
  – **Kalaallisut** (Bittner 2005)

### Questions to address:

• **Broad**: How can futurity and modality be bundled crosslinguistically?

• **Today**: What do we find in Navajo (Dene/Athabaskan)? How does Navajo compare with languages like those cited above?

### Roadmap:

• **Section 2**: Basics of future-marking in Navajo

• **Sections 3-5**: The semantics of future-marking in Navajo

  – Navajo future-marked verbs express predictions and priorities (what *should* or *needs to* happen).

• **Section 6**: Conclusions and future work

\textsuperscript{3}I highlight languages which seem to lump both temporal and modal meanings into a single morpheme. See Kratzer (2011), Matthewson (2014), and Wurmbrand (2014) for cases where future-oriented embedded clauses seem to be selected by other lexical items.
2 Basics of future-marking in Navajo

- As in all other Dene languages, Navajo verbs occur in different morphological forms known as **Modes**.
  - Changing the Mode of a Navajo verb typically involves a change in the shape of the verb stem and one or more prefixes.
  - Modes include Imperfective, Perfective, Future, and Optative.

(4)  
(a) ch’i’deeshkóól  
ch’i’ = di = sh = l = kóół  
out.horizontally = di.fut = 1subj = classifier = swim.fut  
‘I will swim out horizontally’

(b) ch’i’níshkóóh  
ch’i’ = ni = sh = l = kóóh  
out.horizontally = ni.impf = 1subj = classifier = swim.impf  
‘I am swimming out horizontally’

- Future is the only of the Modes which also has an analytic marker, **dooleel**.4
  - Dooleel occurs with stative verbs which do not have special verbal Mode forms ((5-a)) and with verbs already marked for some other Mode ((5-b)).

(5)  
(a) Nisneez  dooleel  
1subj.tall fut  
‘I will be tall.’

(b) ‘Íyáą’  dooleel.  
1subj.eat.perf fut  
‘I will have eaten.’ (Young and Morgan 1987: d351)

- Smith, Perkins, and Fernald (2007) do not find any semantic differences between using **dooleel** vs. using the special Future Mode form of a verb.
  - I treat both types of future marking as interchangeable below.

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4Sometimes shortened by speakers to **doo**.
3 The ambiguity of future-marked verbs

- Navajo future-marked verbs are systematically ambiguous between expressing:
  - Predictions: what will happen
  - Priorities: what ought to happen in light of goals, desires, rules

- In a context like (6-a), the sentence shown makes a prediction.
  - What is predicted to happen may be in conflict with what should happen.

(6) a. Context: Bill is going to Phoenix tomorrow. Whenever he goes to Phoenix, he takes I40. You tell me,

   (Hoozdogóó déyáa=go,) Bill I40 ’átįngóó bił ’adoolwoł.
Phoenix.to 3S.go.IMPF=GO Bill I40 road.to 3O.with.3S.drive.FUT
‘(To get to Phoenix,) Bill will take I40.’

- In a context like (7-a), the sentence shown expresses what should happen in light of goals, desires, or rules.
  - What should happen may be in conflict with what is predicted to happen.

(7) a. Context: Bill is going to Phoenix tomorrow. Whenever he goes to Phoenix, he takes back roads rather than the interstate highway. However, you think that the best route is I40: it’s the fastest, the safest, and the most attractive. You say,

   (Hoozdogóó déyáa=go,) Bill I40 ’átįngóó bił ’adoolwoł.
Phoenix.to 3S.go.IMPF=GO Bill I40 road.to 3O.with.3S.drive.FUT
‘(To get to Phoenix,) Bill should take I40.’

- The term ‘priority’ or ‘prioritizing’ modality from Portner (2009) and picked up by Rubinstein (2012), Kaufmann (2014) and others.
  - “Priority modals have to do with reasons for preferring one situation over another” (Portner 2009: 184).
  - Covers deontic, bouletic, and teleological modality. Often difficult to delineate between these ‘subtypes.’
• All future-marked verbs are systematically ambiguous.

  – Their ambiguity is illustrated below, where \( p\text{-}fut \) conjoined with \( \neg p\text{-}fut \) but is not contradictory.

(8) a.  \textit{Context:} You and I are town inspectors. We visit towns and tell them what they need to fix, and what will be possible given their budgets. You think the roads in this town need to be fixed, but you have seen that the town is very low on money and will not be able to afford it. You’re telling me about the situation.

b. 'Atiin t’áá yá’adát’ééh=ígíí 'ádadoolnííł, 'ákondi doo 'ádadoolnííł road 3PL.SUBJ.good=NOM 3SUBJ.be.FUT but NEG 3SUBJ.be.FUT da.

Neg

\textit{Consultant:} ‘There need to be new roads, but it’s not going to happen.’

‘\textit{Literal:}’ ‘There will be new roads, but it’s not going to happen.’

(9) a.  \textit{Context:} My grandfather is in poor health but still lives alone in his own house. A health care worker has come in to assess the situation. The health care worker thinks my grandfather needs to sell the house (so he can move), but he has told her he absolutely won’t do it. She says:

b. Nichcii bighan baa nahidoonih, ndi doo 2POSS.grandfather 3POSS.house 3OBJ.3SUB.sell.FUT but NEG 'adoolnííł da.

3SUBJ.be.FUT NEG

\textit{Consultant:} ‘Your grandfather needs to sell his house, but he’s not going to do it.’

‘\textit{Literal:}’ #Your grandfather will sell his house, but he’s not going to.

• Future-marked verbs are still ambiguous when embedded.

  – In (10), future-marked verb is embedded by \textit{nizin}, which Bogal-Allbritten (2016) argues is a very light attitude verb which fixes the attitude holder (Alice) and determines the Reference Time for the embedded future:
Aside: The strength of priority modality?

- Navajo does not seem to lexically distinguish between strong (need, must) and weak necessity modality (should, ought) (von Fintel and Iatridou 2008, Rubinstein 2012). Intensifiers seem to affect strength in Navajo:

(11) a. *Context:* You operate a restaurant. You’re telling me about hygiene there. You say, ‘Everybody should wash their hands, but cooks have to wash their hands.’

b. T’áá ́ánółtso nihila’ táádadoogis, ’akóndi tsá’’ adałinígíí bila’
everyone 2poss.hand 3O.3plS.wash.FUT but cooks 3poss.hand
ts’idá yéego táádadoogis.
really 3O.3plS.wash.FUT

*Consultant:* ‘Everyone should wash their hands, but cooks really have to.’

4 The temporality of future marking in Navajo

- Regardless of whether a future-marked verb has a prediction or priority meaning, the verb always has future temporal import.
  - Reichenbachian terminology to talk about times:
    * **Event Time:** The time at which event described by sentence holds.
    * **Reference Time:** The time that a sentence is ‘about’ (its temporal perspective).
    * **Speech Time:** The time at which the sentence is uttered.

- **Future-marked verbs:** Event Time follows Reference Time.

- **Upshot:** Future marking in Navajo still involves an operation on times, regardless of whatever modal meaning we ultimately attribute to it. Navajo future is not just an irrealis marker.\(^5\)

\(^5\)See Matthewson (2006), who uses obligatory future temporality to argue against an irrealis analysis for future marking in St’át’ímeets (Lillooet Salish).
Default contexts:

- In ‘default’ contexts of utterance (Smith et al. 2007), Reference Time equals Speech Time.

- Predictions: what will happen after Speech Time ((12)).

(12) Naaki yiskáago ’adiitchíil.
    two day 1S.give.birth.FUT
    ‘I will give birth in two days.’
    
    Event: I give birth
    RT: Speech Time, now < ET: Time of birth, two days from now

- Priorities: what should happen after Speech Time ((14)).

(13) Nicheeii bighan baa nahideonih.
     2POSS.grandfather 3POSS.house 3OBJ.3SUBJ.sell.FUT
     ‘Your grandfather should/ought to sell his house.’
     RT: When house-selling is desirable (=ST) < ET: When grandfather sells

Backshifting future-marked verbs:

- However, the Reference Time can be distinct from the Speech Time.

- Two ways of setting Reference Time to some time prior to Speech Time:
  
  - Attitude verb or verb of speech with past interpretation.
  
  - Past particle ňt’ée’ after future-marked verb.

- Examples in (14) illustrate backshifted predictions:

(14) a. ’Ashdla’ yikánídá’ ’azee’í’il’ini [naaki yiskáago ’adiitchíil]
    five day.past doctor two day 1SUBJ.give.birth.FUT
    shidiniiid.
    1OBJ.3SUBJ.say.PERF
    ‘Five days ago, the doctor told me I would give birth in two days.’
    RT: Time of doctor’s speech, five days before ST
    < ET: Time of giving birth, two days after RT
b. Shiye’ ’azee’ bąąh ’ályaa=go ch’i’dooldįįl út’ée’.  
my.son medicine 3O.on 3S.make.IMPF=SUB 3S.survive.FUT PAST  
‘If my son had been treated with medicine, he would have survived.’  
RT: Time of treatment < ET: Time of surviving  
(Krause 2001, adapt. by Smith et al. 2007: 52)

- Examples in (15) and (16) illustrate **backshifted priorities**:
  - Event Time = time at which desired/priority-meeting event takes place.
  - Reference Time = time when conditions were such that the described  
    event was desirable or priority-meeting.

(15) Hitler wołyğheę nahasdzáán t’áá dah s’iáá út’ée’ binant’á’í  
Hitler 3S.call.PAST.ENC world all.of.it its.ruler  
deeshłeeł niiziį’.  
1S.be.PROSP 3S.ATT.PERF  
‘Hitler wanted to become the master of the entire world.’  
RT: Time of desire < ET: Time of gaining power  
(Young and Morgan 1987: 715)

(16) a. **Context:** Last year, my grandfather had a chance to move to California,  
but he didn’t. It had always been his dream to move to California. He  
died earlier this year. I tell you,  

b. Shicheii Hoozdogóó donéét út’ée’.  
1POSS.grandfather California.to 3SUBJ.move.FUT PAST  
‘My grandfather should have moved to California.’  
RT: A time when my grandfather was still alive and able to move  
< ET: Time of moving to California
Aside: ET after ST

• ET can precede (15), (16) or follow ST (17) (modeled on Ogihara 2000).

(17) a. Context: Our friend Jane left this morning on a train. Because of bad weather this morning, the train got stuck in snow. The weather is supposed to be good tomorrow, though. You tell me,

   Jane yiskáago ’inda kó’ na’álbaqsii biih’ jidoolwoł ŋt’éé’.  
   Jane tomorrow then train 3OBJ.on 4SUBJ.move.rapidly.FUT PAST ‘Jane should have taken the train tomorrow.’

   RT: Time when taking later train became desirable (this morning)

   < ET: Time of Jane taking the train

The obligatoriness of future temporality:

• Smith et al. (2007) discuss such uses of future-marked verbs as implicating counterfactuality. Smith et al. (2007) describe sentences like (14), (15), and (16-b) as ‘atemporal’ uses of future marking.

   – They are not atemporal, however: while RT may be backshifted in these examples, ET always follows RT in both prediction and priority examples.

• Navajo future marking does not permit any meanings which do not also involve future temporality.

   – Unlike English will, Navajo future marking does not permit a present-oriented epistemic interpretation:

(18) a. Context: It is 3 PM. You know Ted is always in the library at 3 PM. I ask where Ted is; you reply:

   Ted naaltsoos bá hoghan góne’ k’ad sidáa dooleef.  
   Ted book 3OBJ.for house inside now 3SUBJ.sit.IMPF FUT

   (Intended: ‘Ted will be in the library now.’)

   Consultant comment: “You’re talking about what’ going to happen.”

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6 They give evidence following Anderson (1951) and Iatridou (2000) that counterfactuality is not asserted.
5 A denotation for the Navajo future

Observations about the Navajo future:

• **Observation 1:** Any verb that is future-marked carries **future import:** Event Time must follow some Reference Time. Reference Time may equate to Speech Time or may precede it.
  
  − The shiftability of Navajo future contrasts with English *will*...
  − ...but it matches that of abstract English future marker *woll*, posited by Abusch (1985) and picked up by many subsequent authors.
    
    * *woll* + present tense = *will*, *woll* + past tense = *would*
  
  − Navajo joins languages including St’át’ímcets (Matthewson 2006) and Paraguayan Guaraní (Tonhauser 2011) in overtly realizing *woll*.

• **Observation 2:** Navajo future-marked verbs are systematically ambiguous between expressing **predictions** and **priorities**.

  
  − Following a Kratzer (1981)-style theory, I give future marking a single modal entry with a flexible accessibility relation: MB$_{\text{best}}$.
  
  − The kinds of possible worlds (and future times) that are accessible determine whether we get a prediction or a priority reading for a given future-marked expression.

(19) \[ \text{[future]} = \lambda p. \lambda t. \lambda w. \forall w' : w' \in \text{MB}_{\text{best}}(w)(t) \rightarrow \exists t' : t < t' \& p(w')(t') \]

• **Prediction:** MB$_{\text{best}}$ returns worlds which are exactly like the world of evaluation \( w \) at time \( t \) (Reference Time); i.e, a set of worlds \( w' \) whose pasts and presents all look the same.
  
  − Thomason (1970), Copley (2002), and others.

• **Priority:** MB$_{\text{best}}$ returns worlds \( (w') \) in which priorities held in world \( w \) at time \( t \) (Reference Time) are satisfied.
Crosslinguistic view:

- As discussed at the beginning, a link between clearly modal meanings (abilities, desires, rules) and future temporality is not rare, crosslinguistically.
  - Paraguayan Guaraní (Tonhauser 2011), St’át’imcets (Matthewson 2006), Cappadocian Greek (Condoravdi 2003)...

- Languages vary in the kinds of modal accessibility relations associated with future temporality, e.g. priority-oriented relations:
  - Yes: Navajo, Cappadocian Greek?
  - No: St’át’imcets, Paraguayan Guaraní?

- Perhaps other languages have multiple future markers (i.e. expressions with obligatory future import) with different modal accessibility relations.
  - English: would/will, can/could, should form a family of future-oriented and differently modal expressions.\(^7\)

6 Conclusions and future work

Key findings:

- Navajo future-marked verbs can be used to express both predictions and priorities.

- In both uses, Navajo future marking always makes a temporal contribution: Event Time must follow Reference Time.

\(^7\)Thanks to Angelika Kratzer (p.c.) for drawing my attention to this idea.
Future direction #1: Optative Mode

- Other languages within the Dene/Athabaskan family exhibit a similar kind of ambiguity but for Optative Mode.8

- **Question**: What range of meanings are available to Optative-marked verbs across Athabaskan languages?

(20) a. [Hidowedznę k’e deshįta duhshá] yerehwę.
   tomorrow on bush 1SUBJ.go.OPT 1SUBJ.ATT.IMPF
   ‘I’m thinking of going to the bush tomorrow.’  
   Prediction (Rice 1989: 1295)

b. [Deshįta duhshá] yerehwę.
   bush 1SUBJ.go.OPT 1SUBJ.ATT.SUBJDesire
   ‘I want to go to the bush.’ (Rice 1989: 1280)

Future direction #2: Imperatives

- Authors have given imperatives modal analyses that make use of a priority modal very similar to what I allow Navajo future to express (Han 1998, Grosz 2011, Kaufmann 2012; cf. Portner 2007).

- While it is intuitively appealing to say that priority modality also underlies imperfectives in Navajo, there is a snag: imperatives in Navajo can be expressed using verbs marked for other Modes:

(21) Chidí bighandéé’ shá ch’íníłbąąs.
   car 3POSS.house.from 1OBJ.for out.3OBJ.2SUBJ.roll.IMPF
   ‘Drive the car out of the garage for me!’
   Compare: Future-marked ch’ì’diibqą’s (Young and Morgan 1987: d291)

- **Questions**: How do imperative meanings arise in sentences without future-marked verbs? What does this tell us about the semantics of imperatives vs. priority modality?

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8Navajo Optative Mode has very restricted distribution compared to other Dene languages. In the general case, Optative-marked verbs occur with special particles. The combination of the verb and particle express some kind of desire-related meaning, e.g.:

(i) Nahóółtá’ lágo.
   ArealS.rain.OPT hope.not
   ‘I hope it does not rain.’
References


