Futurity, evidentiality & modality: Day 4
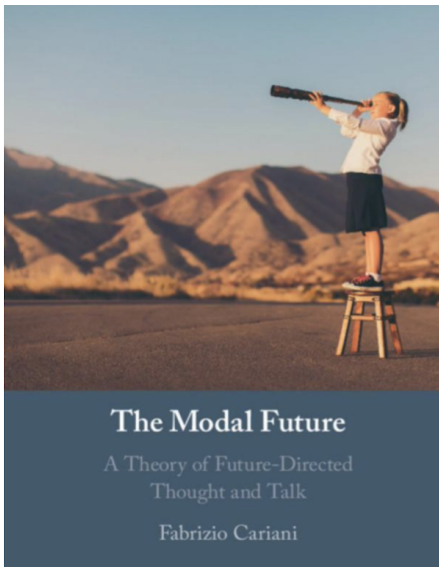## The future

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1. More on the future–asymmetry puzzle
2. Tense vs. modality in future discourse
3. Selection semantics for *will*
4. More on evidentiality and the future

THE MODAL FUTURE

A Theory of Future-Directed Thought and Talk

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A Theory of Future-Directed
Thought and Talk

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I. MORE ON THE FUTURE–ASYMMETRY PUZZLE

The data:

(1)   a.   (**earlier**) The kids will love this pasta. $\mapsto$ good

      b.   (**later**) The kids loved this pasta. $\mapsto$ bad

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Argument:

(P1) In their contexts, the truth conditions of (1a) and (1b) are (approximately) same

(P2) The quality of your evidence does not deteriorate with time

(P3) Given (P1) and (P2) we should expect the acceptability conditions of my assertion to be the same

Taken together with the data, these claims are problematic

Perhaps (P2) is false: your evidence gets worse not because it deteriorated, but because it is no longer the best available.
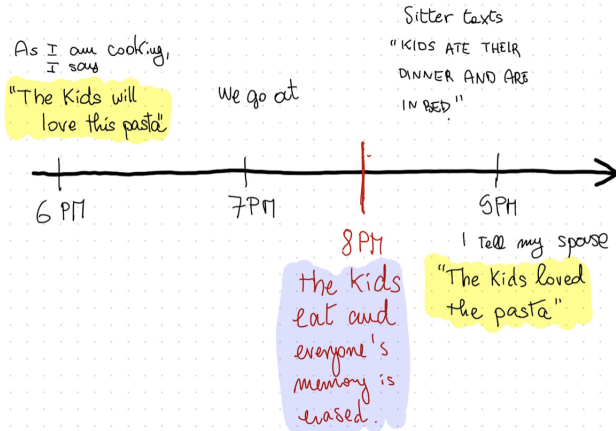
There is a past / future asymmetry.

▶ The potential for abnormalities in the future does not disrupt knowledge.

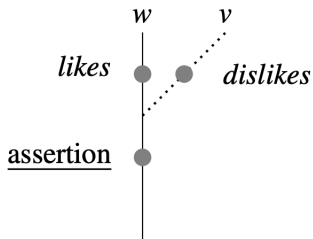▶ The potential for abnormalities in the past typically does.

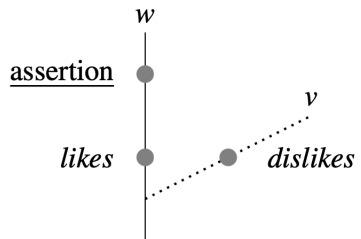**Figure 13.1:** Future abnormality

Figure 13.2: Past abnormality

(2)   Marta's colleague Lorenzo is scheduled to land in Rome from Los Angeles on
      Tricolor airlines at 5 PM. Tricolor airlines is famous for its reliability and
      punctuality. Indeed, that particular flight from Los Angeles to Rome has never been
      late. It is now noon and Lorenzo has been flying for a few hours already, though
      Marta hasn't checked for any updates. Marta says to her friend:

      a.   Lorenzo will land at 5 PM

(3)   Andy pledges to cook plate of pasta for each member of our department on the occasion of their birthday during the next calendar year. Andy's team will research each of these meals ahead of time to maximize the extent to which the birthday person will enjoy it. If the birthday person likes the meal, Andy will collect a badge. Andy and his team are generally remarkably good at this and have never missed out on a badge.

 a.   (at the beginning of the calendar year) Andy will earn all of the badges.

 b.   (halfway through the calendar year) Andy will earn all of the badges.

(4) (later) I know that the kids must have liked the pasta.

If *must* is strong, (5a) entails (5b):

(5) a. The kids must have liked the pasta
    b. The kids liked the pasta

Suppose knowledge is closed under (single-premise) entailment, then (4) entails:

(6) I know that the kids liked the pasta

If so, the problem cannot be that I do not have the relevant knowledge.

1. Ninan uncovered a new puzzle involving the evidential constraints of **will** vs. past.

2. There are substantial problems for both the available evidence view, the abnormality view, and generally for knowledge-based views.

3. My proposal **sketch**: the phenomenon has to do with the evidential demands of **will** vs. the evidential demands of bare claims.

4. A bit more detail about this after the semantics for *will* is in place (today) and after Natasha's framework tomorrow is presented.

II. TENSE VS. MODALITY

What I learned in grade school

▶ languages have three **"simple" tenses**: past, present, and future.

▶ the point of tense is to locate the described eventualities with respect to the time of the speech situation.

▶ in addition to these there are **complex tenses**, whose point is to locate eventualities with respect to other situations.

    ▶ (Now that we've acknowledged these, let's set them aside).

What I learned in graduate school

Two theories of "simple tense" (let p range over sets of w, t pairs):

- ► quantificational:
  - ► $[\![\text{FUT A}]\!] = \lambda p \lambda w \lambda t. \exists t' > t, p(w)(t')$
  - ► $[\![\text{PST A}]\!] = \lambda p \lambda w \lambda t. \exists t' < t, p(w)(t')$

- ► referential:
  - ► neither FUT nor PST is a quantifier
  - ► $[\![\text{FUT}_i \text{ A}]\!]^g = \lambda p \lambda w \lambda t : g(i) > t.\ p(w)(g(i))$
  - ► $[\![\text{PST}_i \text{ A}]\!]^g = \lambda p \lambda w \lambda t : g(i) < t.\ p(w)(g(i))$

(7)   Val didn't turn off the stove

Quantificational theories predict this unobserved scope ambiguity:

(8)   a.   PAST [NOT [Val turn the stove off]]
      b.   NOT [PAST [Val turn the stove off]]

(7)   Val didn't turn off the stove

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(8)   a.   PAST [NOT [Val turn the stove off]]
       b.   NOT [PAST [Val turn the stove off]]

Also there are anaphoric effects between tenses:

(9)   Karen played drums and Richard played keys.

My most modest thesis: English *will* is a modal

Middling ambitious thesis: Many of the expressions that power future reference across languages are modals (and not pure tense operators)

Maximally ambitious thesis: Future reference is universally powered by modals (and not pure tense operators)

▶ question: What do people mean when they say that some languages (like Mandarin Chinese) do not have tense? Or when they say that Japanese does not have a future tense?

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▶ non-answer: they do *not* mean that these languages do not have a way of locating events with respect to speech time.

- ▶ question: What do people mean when they say that some languages (like Mandarin Chinese) do not have tense? Or when they say that Japanese does not have a future tense?
- ▶ non-answer: they do *not* mean that these languages do not have a way of locating events with respect to speech time.
- ▶ answer: what they mean is that these languages lack a *grammatical system* that is devoted to this role. (Recall Natasha yesterday on evidential systems)

Comrie 1976: tense is grammaticalised expression of location in time. On the one hand, this can be viewed as purely definitional. In this way, we would look at a particular form in a language, decide whether it does in fact express location in time and whether it is indeed a grammatical category, and then pronounce it to be tense or not.

Comrie 1976: tense is grammaticalised expression of location in time. On the one hand, this can be viewed as purely definitional. In this way, we would look at a particular form in a language, decide whether it does in fact express location in time and whether it is indeed a grammatical category, and then pronounce it to be tense or not.

*Huddleston and Pullum 2002: We distinguish sharply between the **grammatical** category of tense and the **semantic** category of time.*

But is it a modal?

1. If tense is a grammatical category, *will* is not a tense
2. But that does not show it's a modal: *need positive evidence.* Must think about diagnostics for modality
3. Moreover, under this classification scheme, being a tense is compatible with *also* being a modal
4. We could have a broader category of 'temporally significant expressions' (Bittner 2014)
   ▶ cf. **will**, but also temporal indexicals (e.g. *yesterday*), some aspects, many modals (*may*)
5. But, even more strongly, nothing stands in the way of 'temporally significant expressions' also being modals

(10) a. If Katie travels to Berkeley, she will shop at Amoeba records.
          She <u>will</u> buy a boxed set and a dozen used LP's.

      b. If Katie traveled to Berkeley, she shopped at Amoeba records.
          # She bought a boxed set and a doxen used LP's.

(11) a. If Edna forgets to fill the birdfeeder, she will feel very bad.
          The birds <u>will</u> get hungry.

      b. If Edna forgot to fill the birdfeeder, she felt very bad.
          # The birds got hungry.

This case is a slight modification of a case that appears on the very first page of Roberts 1989; for the use of modal subordination diagnostics to support the modality of **will**, Klecha 2014; the part of yesterday's lecture NK didn't get to applied this diagnostic to evidentiality, talk to her about it!

Aren't there cases of modal subordination with the past?

(12)   If he went to the park yesterday, he had a sandwich. He had a beer too.

(13)   If the supplies arrived yesterday, it was late in the day. But it was before 11pm.

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▶ The objection is slightly mismatched with the dialectic
▶ In (12), *too* does some anaphoric work
▶ As for (13) it's hard to distinguish it from:

(14)   If the supplies arrived yesterday, it was late in the day but it was before 11pm.

Imperative:

(15)   Please do not throw paper towels in the toilet. It <u>will</u> clog and overflow.

Interrogative:

(16)   a.   Does she stay at the ball past midnight?
                The carriage will turn into a pumpkin!

         b.   Did she stay at the ball past midnight?
                # The carriage turned into a pumpkin.

         c.   Did she stay at the ball past midnight?
                The carriage could turn into a pumpkin!

Present directed **will**:

(17) Context: at a restaurant at the end of a meal, you seek to compliment the chef.
You ask the waiter and after a short wait, receive the response:

    a.   The chef will be in the kitchen right now.

Acquaintance inference obviation:

(18)   a.   # This movie is great, but I haven't seen it.

    b.   This movie will be great, but I haven't seen it.

    c.   This movie must be great, but I haven't seen it.

For more on AI, Ninan (2014); Anand and Korotkova (2018); Kennedy and Willer (2016)
Tricky issues here: is this a diagnostic of modality or of evidentiality?

III. TWO MODAL ANALYSES OF *will*

Basic template

(19) a. $\llbracket \textit{will} \rrbracket = \llbracket \textsc{pres} + \textsc{woll} \rrbracket$ (Abusch 1985)

    b. $\llbracket \textsc{woll}_{f,g} \rrbracket = \lambda \mathbf{A} \lambda w. \forall v \in \textsc{domain}(f, g, w), \mathbf{A}(w)$

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Domain options

▶ Peirceanism: all of the worlds that are duplicates of the actual world (of the context) up to the time of utterance.

▶ Copley 2009: all of the *most normal* among the worlds that are duplicates of the actual world…

▶ Kaufmann 2005: all of the *most likely* among the worlds that are duplicates of the actual world…

1. Scopelessness : no interesting scope relations between *not* and **will**

(20) It won't rain

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(20)   It won't rain

2. WEM: *will* A ∨ *will*¬A is a logical truth

(21)   It will rain or it won't.

Problems (Cariani and Santorio 2018)

1. **Scopelessness** : no interesting scope relations between *not* and **will**

(20)   It won't rain

2. **WEM:** *will* A ∨ *will*¬A is a logical truth

(21)   It will rain or it won't.

3. **Credence** : imagine a fair coin; suppose you know it's fair.

(22)   It will land heads

   Plausibly, you ought to assign 1/2 subjective probability to ⟦(22)⟧.
   Quantificational views predict that 0 (or very low) is also permissible.

Selection semantics (Cariani and Santorio 2018)

Selectional starting point

(23) $\llbracket woll_f \rrbracket = \lambda \mathbf{A} \lambda w . \mathbf{A}(sel(f(w), w))$

     a.   SUCCESS: if $\mathbf{A} \neq \emptyset$, for all w, $sel(\mathbf{A}, w) \in \mathbf{A}$

     b.   CENTERING: if $w \in \mathbf{A}$, $sel(\mathbf{A}, w) = w$

     c. f: the worlds that are duplicates of the world of utterance up to the time of utterance

1. Broad idea: **will** a modal that's disguised unless embedded (e.g. in a conditional, or in a discourse involving modal subordination)
2. Going beyond (23):
   - ▶ How do *will*-sentences get to be (typically) about the future?
   - ▶ What about the evidentiality of *will*?

Selectional modal, existential times

(24) $[\![\text{WOLL}_f]\!] = \lambda p \lambda w \lambda t. \exists t' > t. p(sel(f(w), w), t)$

- ▶ loses the scopelessness with respect to negation
- ▶ could be fixed by mixing up with Partee style referential analysis
- ▶ ... but that misses the overall point of the view

Compare:

(25)   a.   It will rain

        b.   It might rain

        c.   It should rain

(a) is about the future in the same way as (b) and (c)

General points:

▶ the future-orientation of *will* is the future orientation of modals
  (Condoravdi 2002)

▶ specifically, *will* has two jobs: (i) selects a world for evaluation of its
  prejacent and (ii) expands interval of evaluation into the future

(26) $[\![$*Val turn off the stove*$]\!] = \lambda e.$**turn off**$\langle$*Val, the stove*$\rangle(e)$

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(27)   a. $[\![\text{PF}]\!] = \lambda P\lambda w\lambda\mathcal{I}.\exists e \in w[\tau(e) \subseteq \mathcal{I}\ \&\ P(e)]$

       b. $[\![\text{PF}(Val\ turn\ off\ the\ stove)]\!] =$
$\lambda w\lambda\mathcal{I}.\exists e \in w[\tau(e) \subseteq \mathcal{I}\ \&\ \textbf{turn off}\langle Val,\ the\ stove\rangle(e)]$

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(28) a. $[\![woll_f]\!] = \lambda p\lambda w\lambda\mathcal{I}.p(sel(f(w), w), \mathcal{I}^+)$

    b. $[\![woll_f(\text{PF}(Val\ turn\ off\ the\ stove))]\!] =$
        $\lambda w\lambda\mathcal{I}.\exists e \in sel(f(w), w)[\tau(e) \subseteq \mathcal{I}^+\ \&\ \textbf{turn off}\langle Val,\ the\ stove\rangle(e)]$

(26) $[\![\textit{Val turn off the stove}]\!] = \lambda e.\textbf{turn off}\langle \textit{Val, the stove}\rangle(e)$

(27) a. $[\![\textsc{pf}]\!] = \lambda P \lambda w \lambda \mathcal{I}.\exists e \in w[\tau(e) \subseteq \mathcal{I} \ \& \ P(e)]$

     b. $[\![\textsc{pf}(\textit{Val turn off the stove})]\!] =$
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(28) a. $[\![\textit{woll}_f]\!] = \lambda \boldsymbol{p} \lambda w \lambda \mathcal{I}.\boldsymbol{p}(\textit{sel}(f(w), w), \mathcal{I}^+)$

     b. $[\![\textit{woll}_f(\textsc{pf}(\textit{Val turn off the stove}))]\!] =$
$\lambda w \lambda \mathcal{I}.\exists e \in \textit{sel}(f(w), w)[\tau(e) \subseteq \mathcal{I}^+ \ \& \ \textbf{turn off}\langle \textit{Val, the stove}\rangle(e)]$

(29) a. $[\![\textsc{pres}]\!] = \lambda \boldsymbol{p} \lambda w.\boldsymbol{p}(w, \textsc{now})$

     b. $[\![\textsc{pres} \ \textit{woll}_f(\textsc{pf}(\textit{Val turn off the stove}))]\!] =$
$\lambda w.\exists e \in \textit{sel}(f(w), w)[\tau(e) \subseteq \textsc{now}^+ \ \& \ \textbf{turn off}\langle \textit{Val, the stove}\rangle(e)]$

(30)   a. $[\![$PRES $woll_f$ *not* (PF(*Val turn off the stove*))$]\!] =$

       b. $[\![$PRES *not* $woll_f$ (PF(*Val turn off the stove*))$]\!] =$

       c. $\lambda w.\forall e \in sel(f(w), w)[\tau(e) \subseteq \text{NOW}^+ \rightarrow \neg \textbf{turn off}\langle Val, the\ stove\rangle(e)]$

IV. MORE ON EVIDENTIALITY AND THE FUTURE

(31) a. **Smoky barbecue**: reasoning from a result to a cause
Context: Angela knows that her neighbors barbecue often. A friend is over at her house and they both smell something smoky. Angela says:
The neighbors #will/✓must be barbecuing (right now).

(Winans 2016:26)

b. **Paint fumes**: reasoning from a cause to a result
Context: Dad is painting his neighbor's kitchen. Reid wants to watch. Reid asks Mom if he can go next door and watch Dad paint. She knows that paint causes fumes so she says: You can't go over there, . . .
. . . It ✓will / #must be hard to breathe in there (right now).

(Winans 2016:29)

will is "anti-abductive" (Cumming and Winans 2021: "An abduction, for our purposes, is an inference from a proposition to its explanation or cause.")

Not just causal:

(32) An inventory of the coins that have fallen down the back of the sofa reveals (to me) that all are silver. My son says he lost his favourite coin back there. I say:

   a. It must be silver.

   b. # It will be silver. (Cumming and Winans 2021: 349)

If the inference is partly abductive and partly not, it is good again:

(33) Angela knows that her neighbors barbecue often, and that when they have barbecues they get drunk. A friend is over at her house and they both smell smoke. Angela says:

   a. The neighbors will be drunk (now). (Winans 2016: 33)

In terms of implementation: nothing mysterious here.

Abusch, D. (1985). *On verbs and time*. Ph. D. thesis, University of Massachusets, Amherst.

Anand, P. and N. Korotkova (2018). Acquaintance content and obviation. In U. Sauerland and S. Solt (Eds.), *Sinn und Bedeutung 22*, Berlin, pp. 161–173. ZAS.

Bittner, M. (2014). *Temporality: Universals and Variation*. Explorations in semantics. Wiley-Blackwell.

Cariani, F. (2021). *The Modal Future: A Theory of Future-Directed Thought and Talk*. Cambridge: Cambridge University Press.

Cariani, F. and P. Santorio (2018). *Will* done better: Selection semantics, future credence, and indeterminacy. *Mind 127*(505), 129–165.

Comrie, B. (1976). *Tense*. Cambridge University Press.

Condoravdi, C. (2002). Temporal interpretation of modals: modals for the present and for the past. In D. Beaver, S. Kaufmann, B. Z. Clark, and L. D. C. Martínez (Eds.), *The construction of meaning*, pp. 59–88. CSLI Publications.

Copley, B. (2009). *The Semantics of the Future*. Routledge.

Cumming, S. and L. Winans (2021). Counterfactuals and abduction. *Ergo 8*(12).

Huddleston, R. and G. Pullum (2002). *Cambridge grammar of the English language*. Cambridge University Press.

Kaufmann, S. (2005). Conditional truth and future reference. *Journal of Semantics 22*(3), 231–280.

Kennedy, C. and M. Willer (2016). Subjective attitudes and counterstance contingency. In M. Moroney, C.-R. Little, J. Collard, and D. Burgdorf (Eds.), *Proceedings of the 26th Semantics and Linguistic Theory Conference*, pp. 913–933.

Klecha, P. (2014). Diagnosing modality in predictive expressions. *Journal of Semantics 31*(3), 443–455.

Ninan, D. (2014). Taste predicates and the acquaintance inference. In T. Snider, S. D'Antonio, and M. Weigand (Eds.), *Semantics and Linguistic Theory 24*, pp. 290–309. LS.

Roberts, C. (1989). Modal subordination and pronominal anaphora in discourse. *Linguistics and Philosophy 12*(6), 683–721.

Winans, L. (2016). *Inferences of "will"*. Ph. D. thesis, University of California, Los Angeles.