



Modality and the semantics of embedding

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Prologue

Recent progress in understanding
modality

Deconstructing modal bases

- Hacquard 2006
- Modal domains can be projected according to fixed recipes from anchors in the actual world: individuals, events, situations.
- Different types of modal anchors are available in many positions in a syntactic representation.

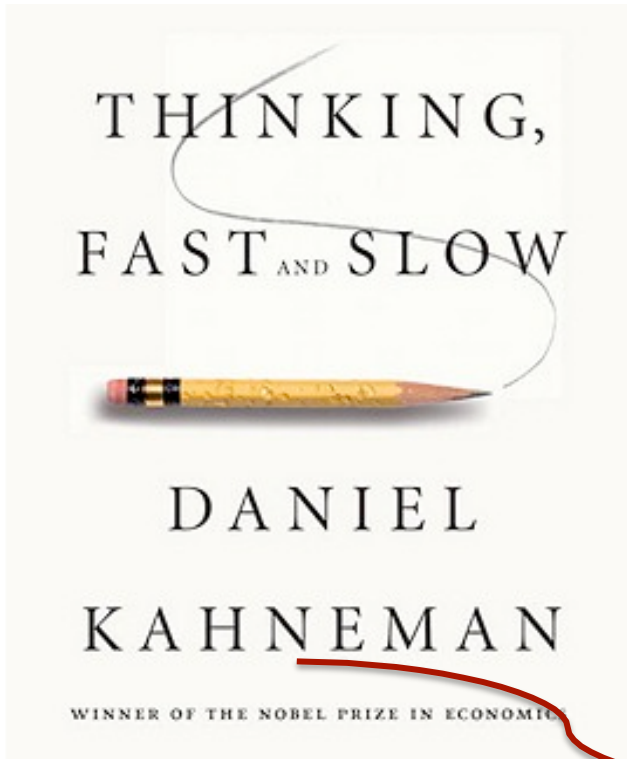
Consequence

- Since suitable modal anchors can be found just about anywhere in a syntactic representation, modality can be found just about anywhere in a syntactic representation.
- Modal auxiliaries, modal aspects, modal tenses, sublexical modality, modal determiners, DP-internal modals, etc.

Deconstructing ordering sources

- von Fintel & Iatridou, Rubinstein, Knobe & Szabó.
- Normative and normalcy constraints on modal domains have two sources. One is specific to modals, the other one affects the interpretation of just about any sentence.

Thinking too fast?

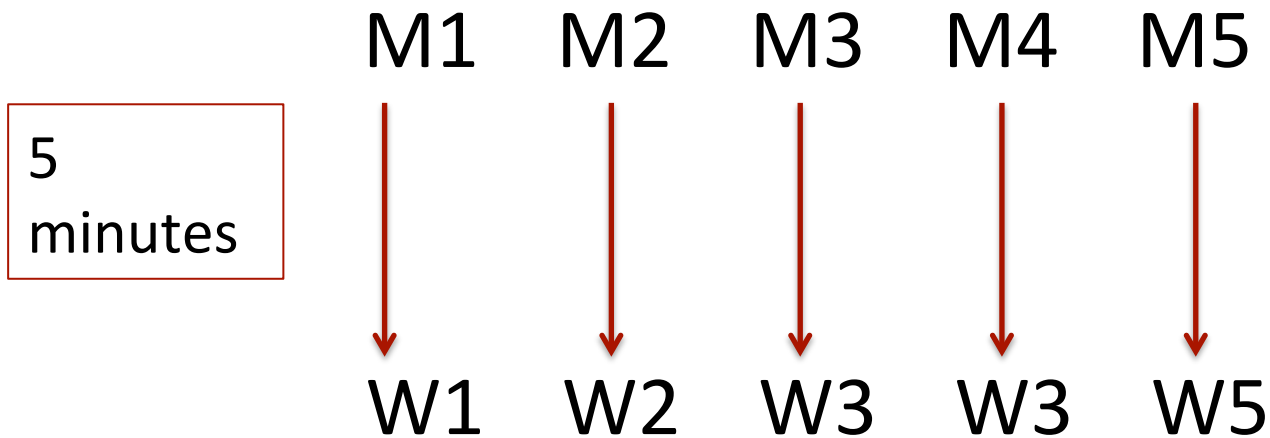


If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?

100 minutes?

5 minutes?

5 machines, 5 minutes, 5 widgets



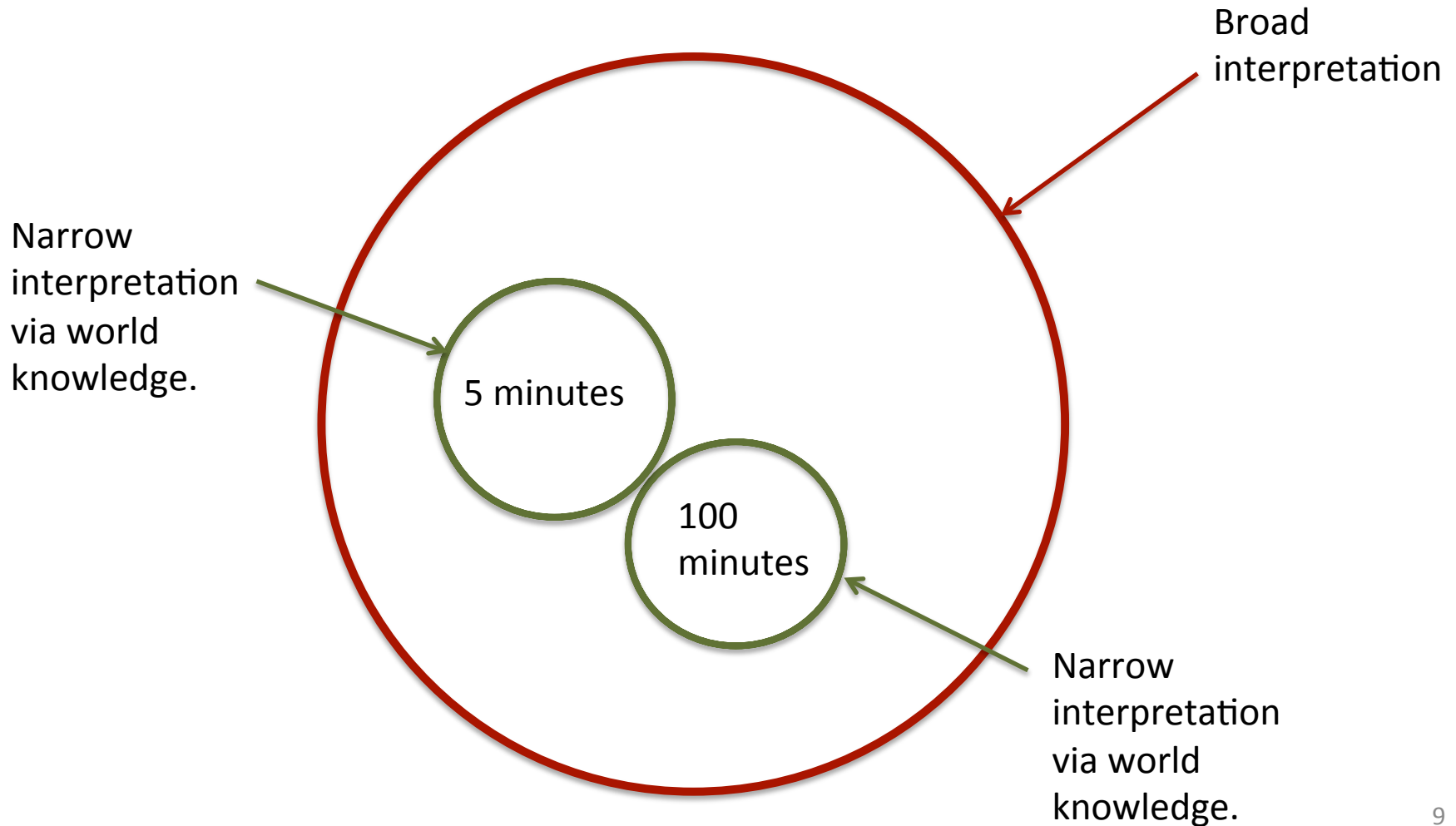
- 100 widgets in 5 minutes.

5 machines, 5 widgets, 5 minutes



- 100 widgets in 100 minutes.

Incompatible interpretations



Eliminating possibilities

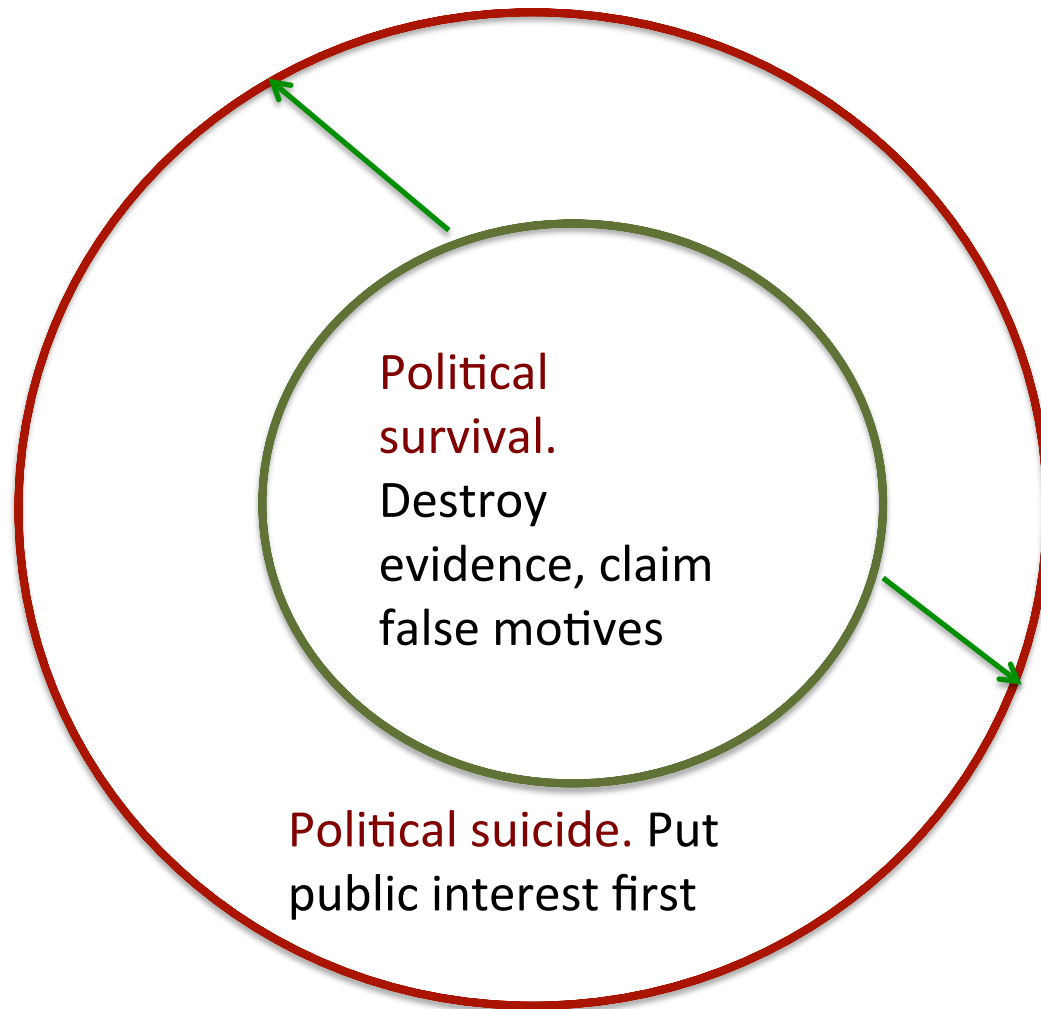
- Grammar determines broad interpretations.
- Narrow interpretations come from interactions with non-linguistic knowledge resources: presumptions about cooperative interaction, presumptions about the normal course of events, etc.

Pushing modal boundaries

“Suppose I am talking with some elected official about the ways he might deal with an embarrassment. So far, we have been ignoring those possibilities that would be political suicide for him. He says: “You see, I **must** either destroy the evidence or else claim that I did it to stop Communism. What else **can** I do?” I rudely reply: “There is one other possibility – you **can** put the public interest first for once!” ”

- Lewis: Scorekeeping in a Language Game.

Pushing modal boundaries



Conclusion

- We shouldn't pack restrictions into the semantics of modals that affect the interpretation of just about **any** sentence.

Embedding

A case study

Plot

- The textbook analysis: verbs that embed sentential complements treats them as modal operators.
- Today: the modal semantics of embedding constructions doesn't come from the embedding verb, but from various types of modal elements in the left periphery of embedded sentences.

Harmonic embedded modals

Revelations from non-standard uses
of modals

Desirable ... ought to

- (3) It seems to us entirely **desirable** that there **ought to** be a constitutional amendment.
- Widely attested, but not exactly in line with American prescriptive grammar.

require ... must

- (4) The urgency of the situation **requires** that the dig **must** continue regardless of the weather and comfort.

Require ... should

- (5) Ethical standards **require** that researchers **should** not put respondents in situations where they might be at risk of harm as a result of their participation.

advisable ... should

- (6) It is therefore **advisable** that you **should** not drive or operate machinery or do any task which requires concentration.

Verb ... should

- (7) He motioned – proposed, insisted, suggested, recommended, advised demanded, petitioned, urged, begged, requested, required, wanted, pleaded – that we **should** set up an emergency fund.

The textbook analysis

- (8) Ralph **advised** that Ortcutt **should** turn himself in.
- Ortcutt should turn himself in in all worlds that are compatible with the content of Ralph's advice.
 - $\lambda p \lambda x \lambda w \forall w' (w' \in \text{Acc}_{\text{advice}}(w) \rightarrow p(w'))$
 - A harmonic interpretation is not expected.

Harmonic reportative modals

(9) Die Legende **sagt**, dass er ein Spion
The legend **says** that he a spy

gewesen sein **soll**.
been be **said is**.

‘The legend says that he supposedly is
a spy.’

Harmonic epistemic modals

- (10) These footprints **show** that Ortcutt **must** have been at the beach.
- (11) The fingerprints **prove** that Ortcutt **must** have opened the safe.
- Prove, establish, reveal, demonstrate, indicate,

Diagnosis

- We need to rethink the very semantics of embedding.

Rethinking the semantics of embedding

Unselected *that*-clauses

Unselected *that*-clauses

- Verbs that embed sentential complements have traditionally been analyzed as propositional operators - quantifiers over possible worlds.
- That move has odd consequences for certain verbs ...

Just a normal verb

(12) Ralph **tobte**, dass man ihn nicht
Ralph raged that they him not

informiert habe.

informed have.SUBJ.

‘Ralph raged that they hadn’t informed
him.’

Just a normal verb

(13) Ralph **seufzte**, dass er betrogen worden
Ralph sighed that he betrayed been

sei.

was.SUBJ.

‘Ralph sighed that he had been betrayed.’

Verbs of manner of speaking

- Babble, bark, bawl, bellow, bleat, boom, bray, burble, cackle, call, carol, chant, chatter, chirp, cluck, coo, croak, croon, crow, cry, drawl, drone, gabble, gibber, groan, growl, grumble, grunt, hiss, holler, howl ...
- Complete list in Levin 1993.

Rethinking the semantics of embedding

That-clauses with nouns: modifiers,
not arguments

Modifiers, not arguments

- (14) a. Ralph **suspected** that Ortcutt was a spy.
b. Ralph's sneaking **suspicion** was that Ortcutt was a spy.
c. Ralph's **hunch** was that Ortcutt was a spy.

Modifiers, not arguments

- (15) a. Ralph **requested** that Ortcutt turn himself in.
- b. Ralph's last two **requests** were that Ortcutt turn himself in.

More dramatic separation

- (16) If Ralph made any **request** at all, it was that Ortcutt turn himself in.
- (17) Ralph had two **requests**. I think one was that Ortcutt turn himself in.
- Modeled after Higgins 1973.

Higgins 1973

- assertion, belief, claim, charge, conclusion, complaint, discovery, dream, expectation, feeling, guess, objection, prediction, report, sense, speculation, suspicion, thought, understanding, warning, worry, etc.
- [Noun be Sentence]

Deontic cases

- Advice, agreement, appeal, chore, desire, etiquette, duty, law, obligation, order, policy, proposal, recommendation, responsibility, rule, task, wish,
- [Noun be Sentence]

Wish list

- Embedding verbs should merely describe events or states.
- Embedded clauses should express properties of the events or states described by their embedding verbs.

The question

- But where does the modal semantics of embedding constructions come from?

Suggested answer

- The highest layers of embedded sentences can host a wide variety of modal elements: differentiated complementizers, mood, harmonic modals, evidential morphology, covert modality in infinitives ...
- A more differentiated left (right) periphery. Rizzi 1997; Aboh 2004, 2006; Saito 2010;

Interlude

Some sources of modality in
embedded sentences

Covert modality in infinitives

(19) Jane found a book for her children to draw cartoons in.

(20) The man to fix the sink is finally here.

- Bhatt 2000, 2006.

A unified semantics?

- (21) The request was for Ortcutt to turn himself in.
- (22) The goal was to surprise Ortcutt at the beach.
- (23) Ralph wanted us to observe Ortcutt.

Dravidian complementizers

All derived from verba dicendi	Bayer 1999
Telugu	ani
Tamil	endru
Kannada	anta
Malayalam	enne

Indo-Aryan final complementizers

All derived from 'say'	Bayer 1999
Bengali	bole
Oriya	boli
Assamese	buli
Marathi	mhanun
Dakhini-Hindi	bolke

Germanic reportative subjunctive

(24) Das Gerücht **sagt**, dass er ein Spion
The rumor **says** that he a spy

sei.

is.SUBJ

‘The legend says that he is a spy.’

- With verbs of thinking; with indirect speech; never with factives.

Japanese complementizers

(25) Taroo-wa [CP Hanako-ga Ziroo-ni atta **to**]

T.-TOP H.-NOM Z.-DAT met *to*

omotteiru

think

‘Taroo thinks that Hanako met Ziroo’

- Saito 2010. *To* is used with verbs of thinking and speaking, also for direct quotes, but never with factives.

Romance deontic subjunctive

(26) The request is that Ortcutt turns ~~turns~~ himself in.

Composing embedded clauses

Content modality: the covert feature
[say] and its overt cousins.

Event identification

Ralph

sighed

[say] Ortcutt was a traitor.



The embedding **verb** describes events of sighing.

The subordinate clause is headed by a covert modal feature **[say]** and describes speech events or mental states that carry the information that Ortcutt was a traitor.

A covert reportative modal

- $[[[\text{say}]]] =$
 $\lambda p \lambda s \forall w (w \in f_{\text{content}}(s) \rightarrow \exists s' (s' \leq w \ \& \ p(s'))).$
- Propositional argument: 'p'.
- Event or situation argument: 's', the modal anchor.

Content modality

- f_{content} maps entities that determine intentional content to the set of possible worlds that are compatible with that content.
- Hacquard 2006; Kratzer 2006; Moulton 2009.
- That's a very simplified view of content, neglecting any issues of hyperintensionality.

Composition

- $[[\text{sigh}]] = \lambda s \text{ sighing}(s)$
- $[[[\text{say}] \text{Ortcutt was a traitor}]] =$
 $\lambda s \forall w (w \in f_{\text{content}}(s) \rightarrow \exists s' (s' \leq w \ \& \ \text{traitor}(\text{Ortcutt})(s'))))$
- $\lambda s (\text{sighing}(s) \ \& \ \forall w (w \in f_{\text{content}}(s) \rightarrow$
 $\exists s' (s' \leq w \ \& \ \text{traitor}(\text{Ortcutt})(s'))))$

Attitude ascriptions

Ralph believes [say] Ortcutt is a traitor.



The embedding **verb** describes states of belief.

The subordinate clause is headed by the covert modal feature **[say]** and describes speech events or mental states that carry the information that Ortcutt is a traitor.

Subcategorized argument

- $[[\text{believe}]] = \lambda x \lambda s \text{belief}(x)(s)$
- $[[[\text{say}] \text{Ortcutt is a traitor}]] =$
 $\lambda x \forall w (w \in f_{\text{content}}(x) \rightarrow \exists s' (s' \leq w \ \& \ \text{traitor}(\text{Ortcutt})(s')))$
- Compose via Restrict (Chung & Ladusaw).

Extraction differences

(27) * Who did Ralph sigh that he saw at the beach?

(28) Who did Ralph believe that he saw at the beach?

- Erteschik-Shir 1973.

Harmonic modals

Not redundant, but matching.

Ralph **behauptet** Ortcutt **soll** ein Spion sein

claims



a spy be

The embedding verb describes events that are claims.

The reportative modal *sollen* heads a subordinate clause that describes speech events, rumors, etc. that carry the information that Ortcutt is a spy.

A cousin of [say]

- $[[\text{sollen}]] =$
 $\lambda p \lambda s \forall w (w \in f_{\text{content}}(s) \rightarrow \exists s' (s' \leq w \ \& \ p(s')))$
- Potential selectional restrictions to ponder:
reportative *sollen* requires anchors like
rumors, reports, claims; rejects mental states.

Ralph **behauptet** Ortcutt **sei** ein Spion

claims



a spy

The embedding verb describes events that are claims.

The reportative subjunctive heads a subordinate clause that describes speech events or mental states that carry the information that Ortcutt was a traitor.

Another cousin of [say]

- $[[\text{subj}]] =$
 $\lambda p \lambda s \forall w (w \in f_{\text{content}}(s) \rightarrow \exists s' (s' \leq w \ \& \ p(s')))$
- Restrictions to ponder: the reportative subjunctive is like [say], but presupposes that the speaker is not committed to the truth of p .

Complementary distribution

(29) Er behauptet dass ich ein Spion sei.

He claims that I a spy be.SUBJ.

(30) Er behauptet dass ich ein Spion sein soll.

He claims that I a spy be SOLL.

(31) *Er behauptet dass ich ein Spion sein solle.

He claims that I a spy be SOLL.SUBJ.

Summary

- Sentential complements embedded under verbs that describe mental states or speech events are headed by a reportative modal. The members of reportative modal paradigms include covert [say], the overt German modal *sollen*, the reportative subjunctive, complementizers like Japanese *to...*

A theory of embedding

- Embedding verbs have a standard neo-Davidsonian semantics.
- Sentential complements are predicates of events or states. Separation is expected.
- Overt or covert harmonic embedded modals are necessary for embedding. They are the source of the modal semantics of embedding constructions.

Composing embedded clauses

Factual modality: the covert feature
[fact] and its overt cousins

Factives

- Show, prove, establish, reveal, demonstrate, indicate,
- know, realize, discover, notice, recognize, find out, remember, forget, be aware that, be unaware that, admit, intuit, sense, see, smell, hear, detect, observe.

Beaver 2010.

Showing that

(32) These footprints show that Ortcutt has been at the beach.

- ... [fact] Ortcutt has been at the beach.
- Ortcutt has been at the beach in all (contextually relevant) worlds that have counterparts of those footprints.

Factual modality

- $[[\text{fact}]]$ =
 $\lambda p \lambda s \forall w (w \in f_{\text{fact}}(s) \rightarrow \exists s' (s' \leq w \ \& \ p(s')))$
- f_{fact} maps any part of a world to the set of possible worlds that have a counterpart of it.
- Arregui (2005, 2007, 2009), for counterfactuals.

Composition

- $[[\text{show}]] = \lambda s \text{ show}(s)$
- $[[\text{these footprints show that ...}]] =$
 $\lambda s (\text{show}(s) \ \& \ \text{holder}(s)(\text{these footprints}) \ \&$
 $\forall w (w \in f_{\text{fact}}(s) \rightarrow \exists s' (s' \leq w \ \& \ \text{at-}$
 $\text{beach}(\text{Ortcutt})(s'))))$

Flexible factivity

(33) The documents show [that **[fact]** Ortcutt is a spy].

- Ortcutt is a spy in all (contextually relevant) worlds that have counterparts of the actual documents. That means Ortcutt is a spy.

Flexible factivity

- (34) The documents show [that [say] Ortcutt is a spy], but they may be forged.
- Ortcutt is a spy in all (contextually relevant) worlds that are compatible with the content of the documents. If they are forged, Ortcutt might not be a spy.

An overt cousin of [fact]

(35) These footprints show that Ortcutt must have been at the beach.

- $[[\text{must}]] =$

$$\lambda p \lambda s \forall w (w \in f_{\text{fact}}(s) \rightarrow \exists s' (s' \leq w \ \& \ p(s')))$$

- Selection restriction to ponder: s can't have intentional content; indirectness requirement.

Summary

- Modal elements in the left periphery of embedded sentential complements are the glue for the semantics of embedding.
- The **End** (or, more accurately, the Beginning).