Question agnosticism and change of state

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Introduction

A distributional puzzle

Question

Which lexical semantic properties license embedded...

A distributional puzzle

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1. ...declarative clauses?

(1) Jo didn't **believe** {that, *whether} Bo was smart.

A distributional puzzle

Question

Which lexical semantic properties license embedded...

1. ...declarative clauses?
2. ...interrogative clauses?

(1) Jo didn't **believe** {that, *whether} Bo was smart.

(2) Jo didn't **wonder** {*that, whether} Bo was smart.

A distributional puzzle

Question

Which lexical semantic properties license embedded...

1. ...declarative clauses?
2. ...interrogative clauses?

(1) Jo didn't **believe** {that, *whether} Bo was smart.

(2) Jo didn't **wonder** {*that, whether} Bo was smart.

(3) Jo didn't **know** {that, whether} Bo was smart.

Challenging to explain predicates like **know** Karttunen 1977a, Groenendijk & Stokhof 1984, Heim 1994, Ginzburg 1995, Lahiri 2002, Egré 2008, Spector & Egré 2015, George 2011, Uegaki 2015

Terminology

Q(uestion)-agnostic Lahiri's (2002) responsives

declaratives and interrogatives (e.g., **know**)

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Q(uestion)-agnostic Lahiri's (2002) responsives

declaratives and interrogatives (e.g., **know**)

Q(uestion)-rejecting

only declaratives (e.g., **believe**)

This talk

Minimal pair

Change-of-state (CoS) **decide** v. stative **intend**

(4) a. Jo **decided** (whether) to go out.
b. Jo **intended** (*whether) to go out.

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(4) a. Jo **decided** (whether) to go out.
b. Jo **intended** (*whether) to go out.

Decide is part of a nontrivial class of CoS Q-agnostics not captured by current theories of Q-agnosticism

(5) decide, judge, estimate, determine, assess, conclude, resolve, choose, assess, evaluate, appraise, rate, select, infer, diagnose, opt, elect

This talk

Overarching claim

Q-agnosticism is licensed by **change-of-state** (CoS)

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- **decide** is Q-agnostic because it is CoS

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Overarching claim

Q-agnosticism is licensed by **change-of-state** (CoS)

- **decide** is Q-agnostic because it is CoS
- **intend** is Q-rejecting because it is not (and because no other lexical property of **intend** licenses Q-agnosticism)

Upshot

Bring together CoS with another known predictor of Q-agnosticism, **veridicality**, via a shared lexical semantic structure

Outline

Veridicality and Q-agnosticism

Two roles for veridicality

Veridicality

A verb V is **veridical** iff $\forall p : [\![\mathrm{V}]\!]^{w_@}(x, p) \rightarrow p(w_@)$

Two roles for veridicality

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(6) Jo **knew** that Bo was alive $\rightarrow$ Bo was alive

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(6) Jo **knew** that Bo was alive $\rightarrow$ Bo was alive

FACTIVE(V) $\longrightarrow$ VERIDICAL(V) if presuppositions are entailments

(7) Jo didn't **know** that Bo was alive $\rightarrow$ Bo was alive

Two roles for veridicality

Veridicality's relationship to Q-agnosticism

1. Determines selection of interrogatives

   (Egré 2008, George 2011, Uegaki 2015)

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2. Determines interpretation of interrogatives

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Veridicality and selection

Hintikka's (1975) observation

High correlation between Q-agnosticism and **factivity**

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Egré's (2008) idea

Reduce Q-agnosticism to **veridicality**

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Reduce Q-agnosticism to **veridicality**

(8) a. Veridical(V) $\longrightarrow$ Q-agnostic(V)

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b. Veridical(V) $\longleftarrow$ Q-agnostic(V)

Veridicality and selection

Challenge

Some Q-agnostic verbs are not **veridical**

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Some Q-agnostic verbs are not **veridical**

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(9) a. Jo **told** Mo that Bo was alive. $\not\rightarrow$ Bo was alive.
b. Jo **told** Mo whether Bo was alive.

Veridicality and selection

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Some Q-agnostic verbs are not **veridical**

(Beck & Rullmann 1999, Lahiri 2002, Egré 2008)

(9) a. Jo **told** Mo that Bo was alive. $\not\rightarrow$ Bo was alive.
b. Jo **told** Mo whether Bo was alive.

(10) a. Jo and Mo **agreed** that Bo was alive. $\not\rightarrow$ Bo was alive.
b. Jo and Mo **agreed** on whether Bo was alive.

Veridicality and selection

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b. Jo **told** Mo whether Bo was alive.

(10) a. Jo and Mo **agreed** that Bo was alive. $\not\rightarrow$ Bo was alive.
b. Jo and Mo **agreed** on whether Bo was alive.

(11) a. Jo$_i$ **decided** PRO$_i$ to leave. $\not\rightarrow$ Jo will leave.
b. Jo$_i$ **decided** whether PRO$_i$ to leave.

Veridicality and selection

Working assumption

Veridical(V) $\longrightarrow$ Q-agnostic(V)

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Two roles for veridicality

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1. Determines selection of interrogatives

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2. Determines interpretation of interrogatives

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Two notions of veridicality

P-veridicality

A verb V is (P-)veridical iff $\forall x, p : [\![\mathrm{V}]\!]^{w_@}(x, p) \rightarrow p(w_@)$

(12) Jo **knew** that Bo was alive $\rightarrow$ Bo was alive

Two notions of veridicality

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(13) Jo **knew** whether Bo was alive
$\rightarrow$ Jo **knew** the true answer to "was Bo alive?"

A verb V is Q-**non**veridical if it is not Q-veridical.

Veridicality and interpretation

Spector & Egré's (2015) observation

High correlation between Q-veridicality and P-veridicality

Spector & Egré's (2015) proposal

Q-veridicality is derived from P-veridicality

Veridicality and interpretation

Spector & Egré's (2015) formalization

When a Q-agnostic predicate takes a question *Q*, it relates an attitude holder to some possible (complete) answer to *Q*

(cf. Hamblin 1973, Groenendijk & Stokhof 1984, Beck & Rullmann 1999, Lahiri 2002)

Spector & Egré's (2015) formalization

When a Q-agnostic predicate takes a question Q, it relates an attitude holder to some possible (complete) answer to Q

(cf. Hamblin 1973, Groenendijk & Stokhof 1984, Beck & Rullmann 1999, Lahiri 2002)

$$\forall x : [\![V]\!]^{w_@}(x, Q) \rightarrow \exists p \in Q : [\![V]\!]^{w_@}(x, p)$$

But if a verb V is P-veridical, then...

$$\begin{bmatrix} \forall x, p' : & [\![V]\!]^{w_@}(x, p') \rightarrow p'(w_@) \wedge \\ \exists p \in Q : & [\![V]\!]^{w_@}(x, p) \end{bmatrix} \Longrightarrow \exists p'' \in Q : p''(w_@) \wedge [\![V]\!]^{w_@}(x, p'')$$

Moving forward

System

Adopt Spector & Egré's proposal that embedded interrogatives denote possible complete answers (exhaustified Hamblin Qs)

Goal

Some alternative explanation of Q-agnostic predicates that are neither P-veridical nor Q-veridical—e.g. CoS predicates

Data and proposal

Our proposal

Claim

Change-of-state (CoS) licenses Q-agnosticism

(14) a. Jo hasn't **decided** (whether) to go out.
b. Jo didn't **intend** (*whether) to go out.

Plan

Show that...

1. ...Spector & Egré's proposal makes no wrong predictions about **CoS** verbs, but it undergenerates entailments
2. ...to strengthen their predictions without overgenerating, we have to make reference to **CoS**

Two contexts

	Selecting	Alternating

Two contexts

	Selecting	Alternating
decide to		

Two contexts

	Selecting	Alternating
decide to		
decide whether to		

Context 1: selecting

Selecting contexts

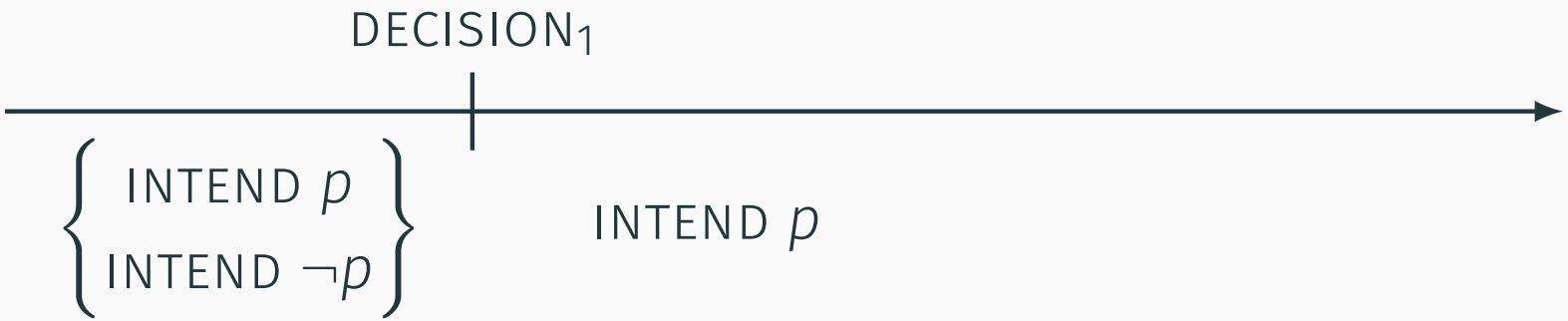
DECIDER selects an intention from set of possible intentions

Selecting contexts

DECIDER selects an intention from set of possible intentions

(15) a. Before 3pm, Jo was considering whether to leave.
b. → It's false that Jo intended to leave before 3pm.
c. → It's false that Jo intended not to leave before.

(16) At 3pm, Jo decided to leave at 5pm.



Alternating contexts

DECIDER changes intention from mutually exclusive intention

(17) At 3pm, Jo decided to leave at 5pm.

(18) At 4pm, Jo changed her mind and decided not to leave.

Two contexts

	Selecting	Alternating
decide to	✓	✓
decide whether to		

Selecting v. switching contexts

Possibility

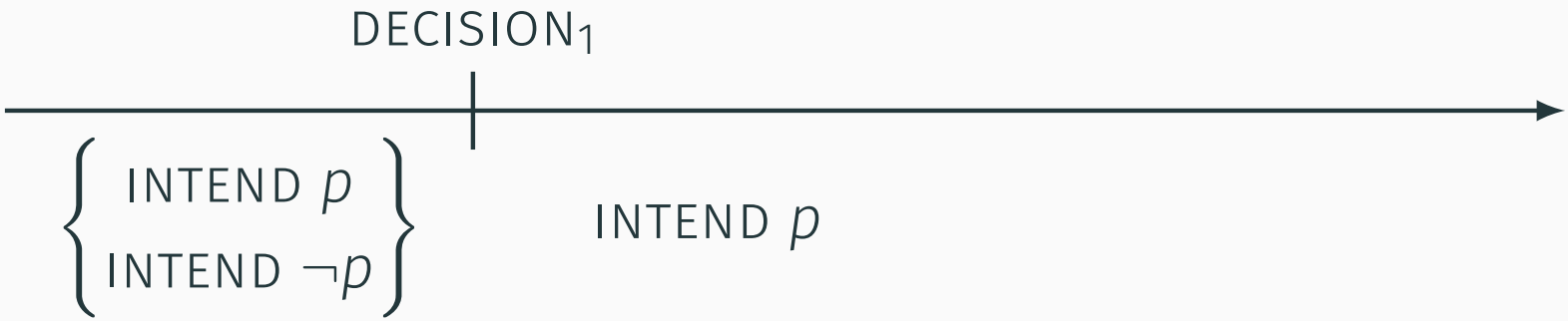
Given only the (prototypical) selecting contexts...

(19) At 3pm, Jo decided to leave at 5pm.

a. $\rightarrow$ Jo intended to leave after 3pm.

b. $\overset{?}{\rightarrow}$ It's F that Jo intended to leave before 4pm

c. $\overset{?}{\rightarrow}$ It's F that Jo intended not to leave before 4pm



Selecting v. switching contexts

Conclusion

The availability of alternating contexts suggests...

(20) At 4pm, Jo decided not to leave at 5pm.

a. $\rightarrow$ Jo intended not to leave after 4pm.
b. $\rightarrow$ It's F that Jo intended to leave before 4pm
c. $\not\rightarrow$ It's F that Jo intended not to leave before 4pm

An initial try

A CoS denotation

Suggests a very straightforward CoS denotation for **decide to** (simplified to capture just entailments of interest)

(21) $[\![\text{decide S}]\!]^t = \lambda x.\neg \textsc{intend}(x, [\![\text{S}]\!], < t) \wedge \textsc{intend}(x, [\![\text{S}]\!], \geq t)$

Question embedding and CoS

Question

What predictions does Spector & Egré's (2015) proposal make?

(22) Jo decided whether to leave.

Answer 1

Predicts everything correctly for post-states

(23) Either Jo intended to leave or she intended not to leave.

Question embedding and CoS

Question

What predictions does Spector & Egré's (2015) proposal make?

(24) At 4pm, Jo decided whether to leave at 5pm.

Answer 2

For pre-states, where it makes predictions, they are correct

Question embedding and CoS

Question

What predictions does Spector & Egré's (2015) proposal make?

(24) At 4pm, Jo decided whether to leave at 5pm.

Answer 2

For pre-states, where it makes predictions, they are correct

(25) Before 4pm, either it's false that Jo decided to leave at 5pm or it's false that she decided not to leave at 5pm.

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(25) Before 4pm, either it's false that Jo decided to leave at 5pm or it's false that she decided not to leave at 5pm.

(26) $\exists p \in Q : \neg \textsc{intend}(x, p, < t) \wedge \textsc{intend}(x, p, \geq t)$

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But this prediction is too weak

Question embedding and CoS

Observation

While **decide to** is licensed in selecting and alternating contexts, **decide whether to** is only licensed in selective contexts

(27) a. Before 3, Jo intended neither to leave nor not to.
b. At 3, Jo decided whether to leave.

(28) a. Before 4, Jo intended either to leave or not to.
b. #At 4pm, Jo decided whether to leave at 5pm

Intuition

(28b) $\rightarrow$ Jo have no intention with respect to leaving before 4pm

Two contexts

	Selecting	Alternating
decide to	✓	✓
decide whether to		

Two contexts

	Selecting	Alternating
decide to	✓	✓
decide whether to	✓	#

Question embedding and CoS

Consequence

We need (30), rather than (29) for CoS embedded questions.

(29) $\exists p \in Q : \neg \textsc{intend}(x, p, < t) \wedge \textsc{intend}(x, p, \geq t)$

(30) $\forall p \in Q : \neg \textsc{intend}(x, p, < t) \wedge \exists p \in Q : \textsc{intend}(x, p, \geq t)$

Observation

The pre-state conjunct is equivalent to the negation of the post-state conjunct (*modulo* tense)

(31) $\forall p \in Q : \neg \textsc{intend}(x, p) \leftrightarrow \neg \exists p \in Q : \textsc{intend}(x, p)$

Question embedding and CoS

Idea

Apply Spector & Egré's (2015) proposal to each conjunct

(32) $Q = [\![\text{whether S}]\!] = \{[\![\text{S}]\!], \neg[\![\text{S}]\!]\} = \{p, \neg p\}$

(33) $[\![\text{decide whether S}]\!]^t = \lambda x.\neg \textsc{intend}(x, Q, < t) \wedge \textsc{intend}(x, Q, \geq t)$

(34) $[\![\text{decide whether S}]\!]^t = \lambda x.\neg \exists p \in Q : \textsc{intend}(x, p, < t) \wedge$
$\exists p \in Q : \textsc{intend}(x, p, \geq t)$

Question embedding and CoS

Problem

Mysterious why we shouldn't be able to do this for **intend**

(35) a. Jo hasn't **decided** whether to go out.
b. *Jo didn't **intend** whether to go out.

$$[\![\text{intend whether S}]\!] = \lambda x.\textsc{intend}(x, [\![\text{whether S}]\!])$$
$$= \lambda x.\exists p \in [\![\text{whether S}]\!] : \textsc{intend}(x, p)$$

Question embedding and CoS

Observation

Problem doesn't arise for CoS veridicals

(36) a. Jo doesn't **figure out** (whether) Bo left.
b. Jo doesn't **know** (whether) Bo left.

$$\begin{aligned}[\![\text{know whether S}]\!] &= \lambda x.\textsc{know}(x, [\![\text{whether S}]\!]) \\ &= \lambda x.\exists p \in [\![\text{whether S}]\!] : \textsc{know}(x, p)\end{aligned}$$

Question embedding and CoS

Upshot

Only target certain event types (e.g. intentions) in CoS structure

Proposal

Make interrogative-taking dependent on CoS

Implementation

Our implementation

Minimal requirements

For **decide to**, something of the form in (37)

(37) $\ldots \neg \textsc{intend}(x, [\![\mathrm{S}]\!], < t) \wedge \textsc{intend}(x, [\![\mathrm{S}]\!], \geq t)$

For **decide whether to**, something of the form in (38)

(38) $\ldots \forall p \in Q : \neg \textsc{intend}(x, p, < t) \wedge \exists p \in Q : \textsc{intend}(x, p, \geq t)$

Our implementation

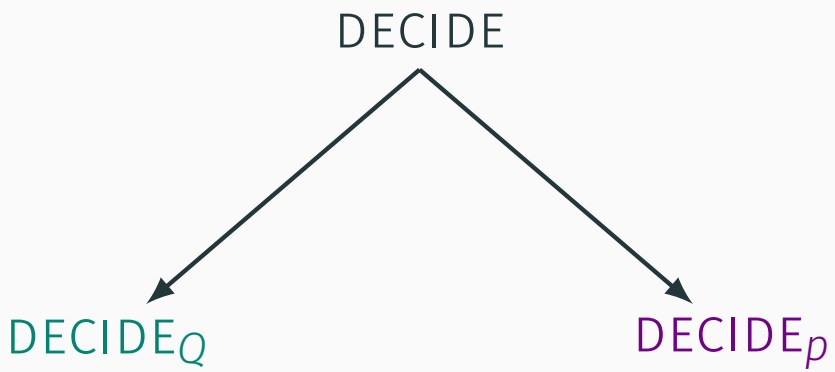
Core idea

Q-agnostic predicates undergo a regular polysemy

Lexical abstraction

Polysemy rules

Lexicon



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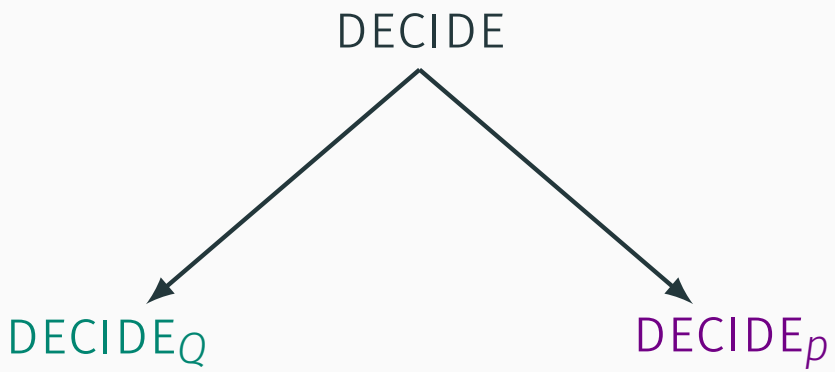


George's (2011) Twin Relations Theory

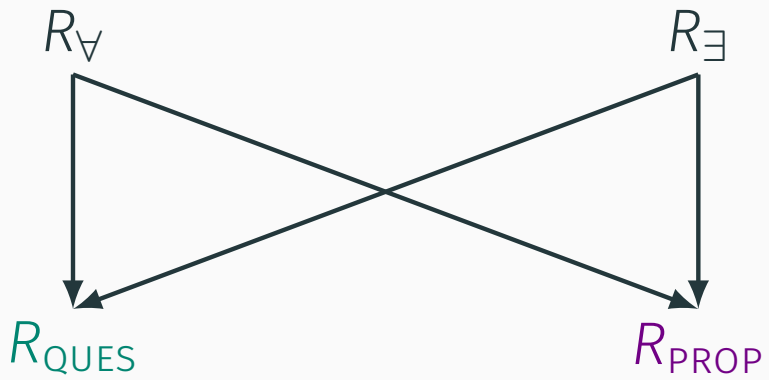
Goal

A polysemy approach for Q-agnostics

Elementary relations

Lexical templating

Lexicon



Lexical templates

Proposition-taking variant passes p to elementary relations

$$R_{\text{PROP}} \equiv \lambda w.\lambda x.\lambda p.R_{\forall}(x,p,w) \wedge R_{\exists}(x,p,w)$$

Question-taking variant passes $p \in Q$ to elementary relations

$$R_{\text{QUES}} \equiv \lambda w.\lambda x.\lambda Q.\forall p \in Q : R_{\forall}(x,p,w) \wedge \exists p \in Q : R_{\exists}(x,p,w)$$

Veridicality arises from $R_{\forall}$

$$\text{KNOW}_{\forall}(x,p,w) \equiv \text{BELIEVE}(x,p,w) \rightarrow p(w)$$

R_{PROP} corresponds to the form we need for **decide to**, and
R_{QUES} corresponds to the form we need for **decide whether to**

(39) $\text{DECIDE}_{\forall} = \neg\text{INTEND}$

(40) $\text{DECIDE}_{\exists} = \text{INTEND}$

$R_{\forall} = R_{pre}$ characterizes pre-states
$R_{\exists} = R_{post}$ charatcerizes post-states

Basic approach

Hacquard's (2010) neo-Davidsonian event content approach

(cf. Kratzer 2006, Moulton 2009, Bogal-Allbritten 2016)

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(41) $\textsc{con}(e) = \{w : w \text{ is compatible with the contents of } e\}$

(42) $[\![[\text{V S}]_{VP}]\!] = \lambda e.P_V(e) \wedge \forall w \in \textsc{con}(e) : [\![\text{S}]\!](w)$

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Champollion's (2015) verb-as-event-quantifier approach

(43) $[\![\text{VP}]\!] = \lambda f.\exists e : f(e) \wedge \ldots$

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Champollion's (2015) verb-as-event-quantifier approach

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Our attitude denotations

(44) $[\![[\text{V S}]_{VP}]\!] = \lambda f.\exists e : P_V(e) \wedge f(e) \wedge \forall w \in \textsc{con}(e) : [\![\text{S}]\!](w)$

Our implementation

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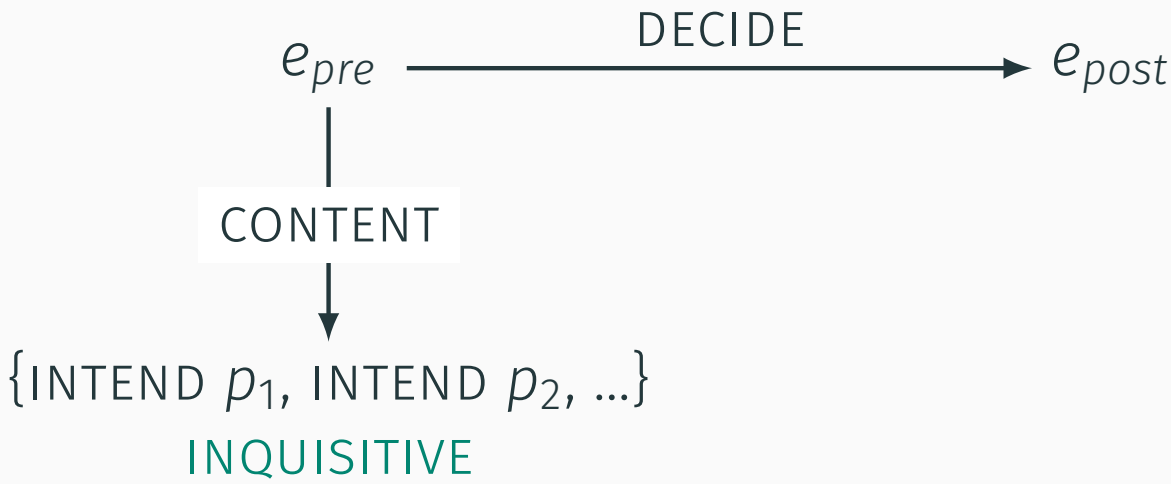

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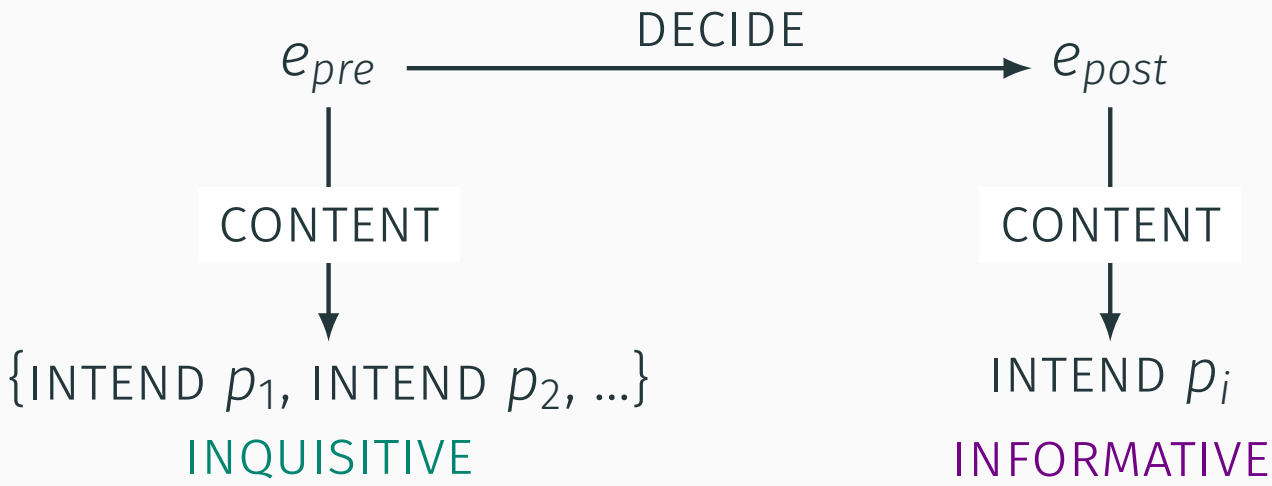

Defining decision

Define DECISION to relate a pre-state and a post-state

(45) $\textsc{decision}(e, e_{pre}, e_{post}) \equiv e$ is a decision with pre-state e_{pre} and post-state e_{post}

Define constraint on inquisitive pre-state

(46) $R_{pre}(e, p) = \neg\forall w \in \textsc{con}(e) : p(w)$

Define constraint on informative post-state

(47) $R_{post}(e, p) = \forall w \in \textsc{con}(e) : p(w)$

Defining lexical templates

As expected for a change-of-state verb

(48) $\forall e, p : R_{pre}(e, p) \longleftrightarrow \neg R_{post}(e, p)$

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Extend George's lexical templates to events

(49) a. $[\![\text{decide}_{\text{PROP}}]\!] = R_{\text{PROP}}(\textsc{decision}) = (50a)$
b. $[\![\text{decide}_{\text{QUES}}]\!] = R_{\text{QUES}}(\textsc{decision}) = (50b)$

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(50) a. $\lambda p.\lambda f.\exists e, e_{pre}, e_{post} : \text{DECISION}(e, e_{pre}, e_{post}) \wedge f(e)$

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$\wedge R_{pre}(p)(e_{pre}) \wedge R_{post}(p)(e_{post})$

Defining lexical templates

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(49) a. $[\![\text{decide}_{\text{PROP}}]\!] = R_{\text{PROP}}(\text{DECISION}) = (50a)$
b. $[\![\text{decide}_{\text{QUES}}]\!] = R_{\text{QUES}}(\text{DECISION}) = (50b)$

(50) a. $\lambda p.\lambda f.\exists e, e_{pre}, e_{post} : \text{DECISION}(e, e_{pre}, e_{post}) \wedge f(e)$
$\wedge R_{pre}(p)(e_{pre}) \wedge R_{post}(p)(e_{post})$
b. $\lambda Q.\lambda f.\exists e, e_{pre}, e_{post} : \text{DECISION}(e, e_{pre}, e_{post}) \wedge f(e)$

Defining lexical templates

As expected for a change-of-state verb

(48) $\forall e, p : R_{pre}(e, p) \longleftrightarrow \neg R_{post}(e, p)$

Extend George's lexical templates to events

(49) a. $[\![\text{decide}_{\text{PROP}}]\!] = R_{\text{PROP}}(\text{DECISION}) = (50a)$
b. $[\![\text{decide}_{\text{QUES}}]\!] = R_{\text{QUES}}(\text{DECISION}) = (50b)$

(50) a. $\lambda p.\lambda f.\exists e, e_{pre}, e_{post} : \text{DECISION}(e, e_{pre}, e_{post}) \wedge f(e)$
$\wedge R_{pre}(p)(e_{pre}) \wedge R_{post}(p)(e_{post})$
b. $\lambda Q.\lambda f.\exists e, e_{pre}, e_{post} : \text{DECISION}(e, e_{pre}, e_{post}) \wedge f(e)$
$\wedge \forall p \in Q : R_{pre}(p)(e_{pre})$
$\wedge \exists p \in Q : R_{post}(p)(e_{post})$

Full denotations

When **decide** takes a declarative...

$$[\![\text{Jo decide}_{\text{PROP}}\ \text{S}]\!] = \exists e, e_{pre}, e_{post} : \textsc{decision}(e, e_{pre}, e_{post}) \wedge \textsc{agent}(j, e)$$

Full denotations

When **decide** takes a declarative...

$$[\![\text{Jo decide}_{\text{PROP}}\ \text{S}]\!] = \exists e, e_{pre}, e_{post} : \textsc{decision}(e, e_{pre}, e_{post}) \wedge \textsc{agent}(j, e) \wedge \neg \forall w \in \textsc{con}(e_{pre}) : [\![\text{S}]\!](w)$$

Full denotations

When **decide** takes a declarative...

$$[\![\text{Jo decide}_{\text{PROP}}\ \text{S}]\!] = \exists e, e_{pre}, e_{post} : \textsc{decision}(e, e_{pre}, e_{post}) \wedge \textsc{agent}(j, e)$$
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$$\wedge \forall w \in \textsc{con}(e_{post}) : [\![\text{S}]\!](w)$$

Full denotations

When **decide** takes a declarative...

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When **decide** takes an interrogative...

$$[\![\text{Jo decide}_{\text{QUES}}\ ?\text{S}]\!] = \exists e, e_{pre}, e_{post} : \textsc{decision}(e, e_{pre}, e_{post}) \wedge \textsc{agent}(j, e)$$

Full denotations

When **decide** takes a declarative...

$$[\![\text{Jo decide}_{\text{PROP}}\ \text{S}]\!] = \exists e, e_{pre}, e_{post} : \textsc{decision}(e, e_{pre}, e_{post}) \wedge \textsc{agent}(j, e) \\ \wedge \neg\forall w \in \textsc{con}(e_{pre}) : [\![\text{S}]\!](w) \\ \wedge \forall w \in \textsc{con}(e_{post}) : [\![\text{S}]\!](w)$$

When **decide** takes an interrogative...

$$[\![\text{Jo decide}_{\text{QUES}}\ \text{?S}]\!] = \exists e, e_{pre}, e_{post} : \textsc{decision}(e, e_{pre}, e_{post}) \wedge \textsc{agent}(j, e) \\ \wedge \forall p \in [\![\text{?S}]\!] : \neg\forall w \in \textsc{con}(e_{pre}) : p(w)$$

Full denotations

When **decide** takes a declarative...

$$[\![\text{Jo decide}_{\text{PROP}}\ \text{S}]\!] = \exists e, e_{pre}, e_{post} : \textsc{decision}(e, e_{pre}, e_{post}) \wedge \textsc{agent}(j, e)$$
$$\wedge \neg \forall w \in \textsc{con}(e_{pre}) : [\![\text{S}]\!](w)$$
$$\wedge \forall w \in \textsc{con}(e_{post}) : [\![\text{S}]\!](w)$$

When **decide** takes an interrogative...

$$[\![\text{Jo decide}_{\text{QUES}}\ \text{?S}]\!] = \exists e, e_{pre}, e_{post} : \textsc{decision}(e, e_{pre}, e_{post}) \wedge \textsc{agent}(j, e)$$
$$\wedge \forall p \in [\![\text{?S}]\!] : \neg \forall w \in \textsc{con}(e_{pre}) : p(w)$$
$$\wedge \exists p \in [\![\text{?S}]\!] : \forall w \in \textsc{con}(e_{post}) : p(w)$$

Embedded modality

Remaining question

Where does the **intention** entailment come from?

Embedded modality

Remaining question

Where does the **intention** entailment come from?

Possible answer

Decision pre-states just **are** intentional states

Embedded modality

Evidence

Always(?) intention for infinitivals

(51) Jo {determined, decided, chose} whether to leave.

Embedded modality

Evidence

Always(?) intention for infinitivals

(51) Jo {determined, decided, chose} whether to leave.

Otherwise dependent on content of finite complement

(52) a. Jo decided whether she would leave.
b. Jo decided whether Bo could leave.

Embedded modality

Remaining question

Where does the **intention** entailment come from?

Possible answer

Decision pre-states just **are** intentional states

Our answer

Modality in the embedded clause (Bhatt 1999, Grano 2012, Wurmbrand 2014, White 2014)

Conclusion

Wrapping up

Working assumption

Veridicality predicts Q-agnosticism

Proposal

Change-of-State (CoS) also predicts Q-agnosticism

Implementation

Assimilates CoS pre-state entailments to veridicality entailments

Wrapping up

Question

Why would pre-state entailments be like veridicality entailments?

Relevant observation

Pre-state entailments are generally backgrounded (cf. **start**, **stop**) (Roberts 1996, Simons 2001, Abusch 2002, Simons et al. 2010, Abusch 2010, Abrusán 2011, Romoli 2011, Anand & Hacquard 2014)

A generalization

Tentative generalization

No monomorphemic verb characterizes a relation between an informative pre-state and an inquisitive post-state (*__undecide__)

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Possible exception: __forget__

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Tentative generalization

No monomorphemic verb characterizes a relation between an informative pre-state and an inquisitive post-state (*__undecide__)

Possible exception: __forget__

Relevance

Suggests an asymmetry between pre-states and post-states that we don't currently encode

Suggestion

Whatever gives rise to pre-state backgrounding for other CoS predicates also gives rise to this asymmetry

Future directions

Direction 1

Reducing the relationship between veridicality and Q-agnosticism to a relationship between CoS and Q-agnosticism

Direction 2

Explaining remaining nonveridicals in terms of event structure

Reducing to CoS

Observation

Many verbal veridicals besides the stative **know** are CoS

remember, forget, discover, find out, figure out, realize, recognize, ...

Reducing to CoS

Timid reduction

Most verbal veridicals explained by CoS; **know** stipulated

Aggressive reduction

Know has a bipartite structure involving a knowledge state (fact contents) and a belief state (proposition contents) (Kratzer 2002)

Explaining residuals

Question

What about the other Q-agnostic nonveridicals?

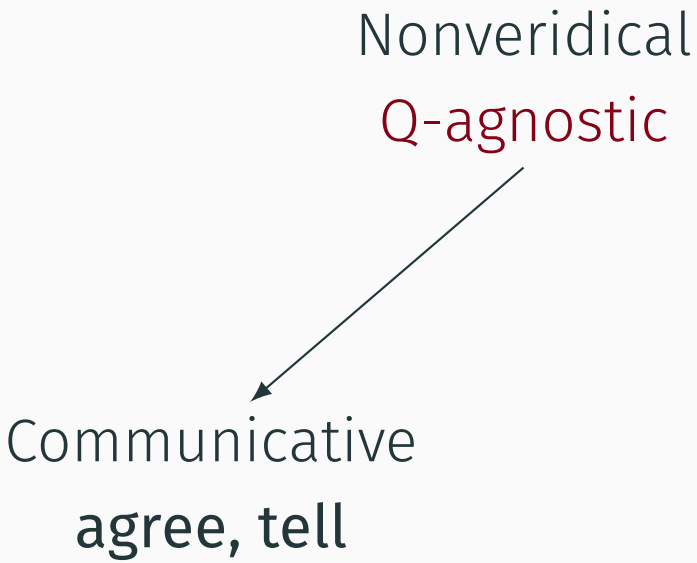
Regimenting nonveridical Q-agnostics

Nonveridical

Q-agnostic

(cf. Anand & Hacquard 2014, White & Rawlins 2016)

Regimenting nonveridical Q-agnostics



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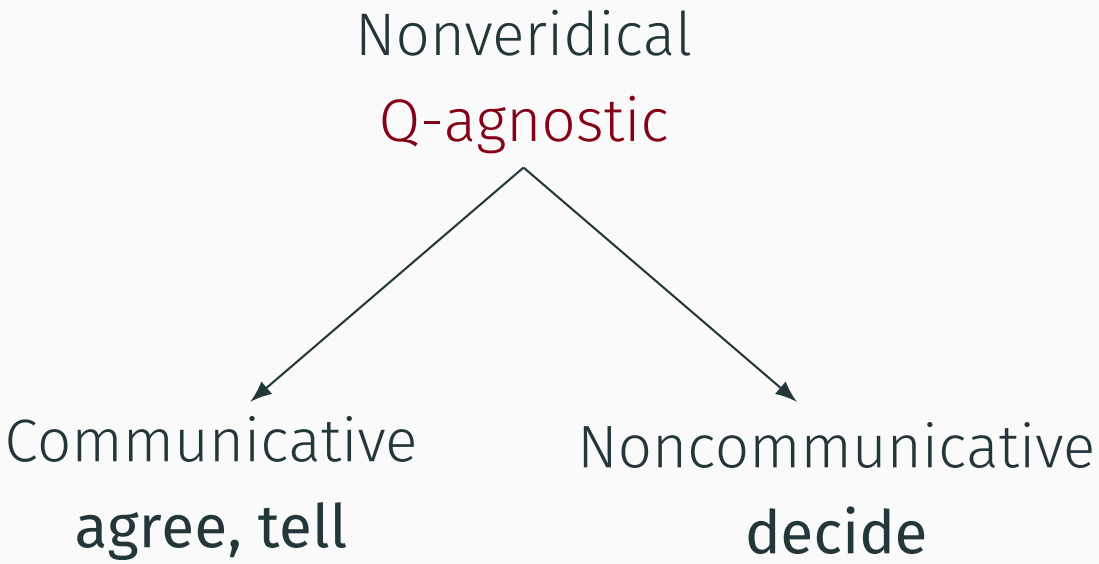
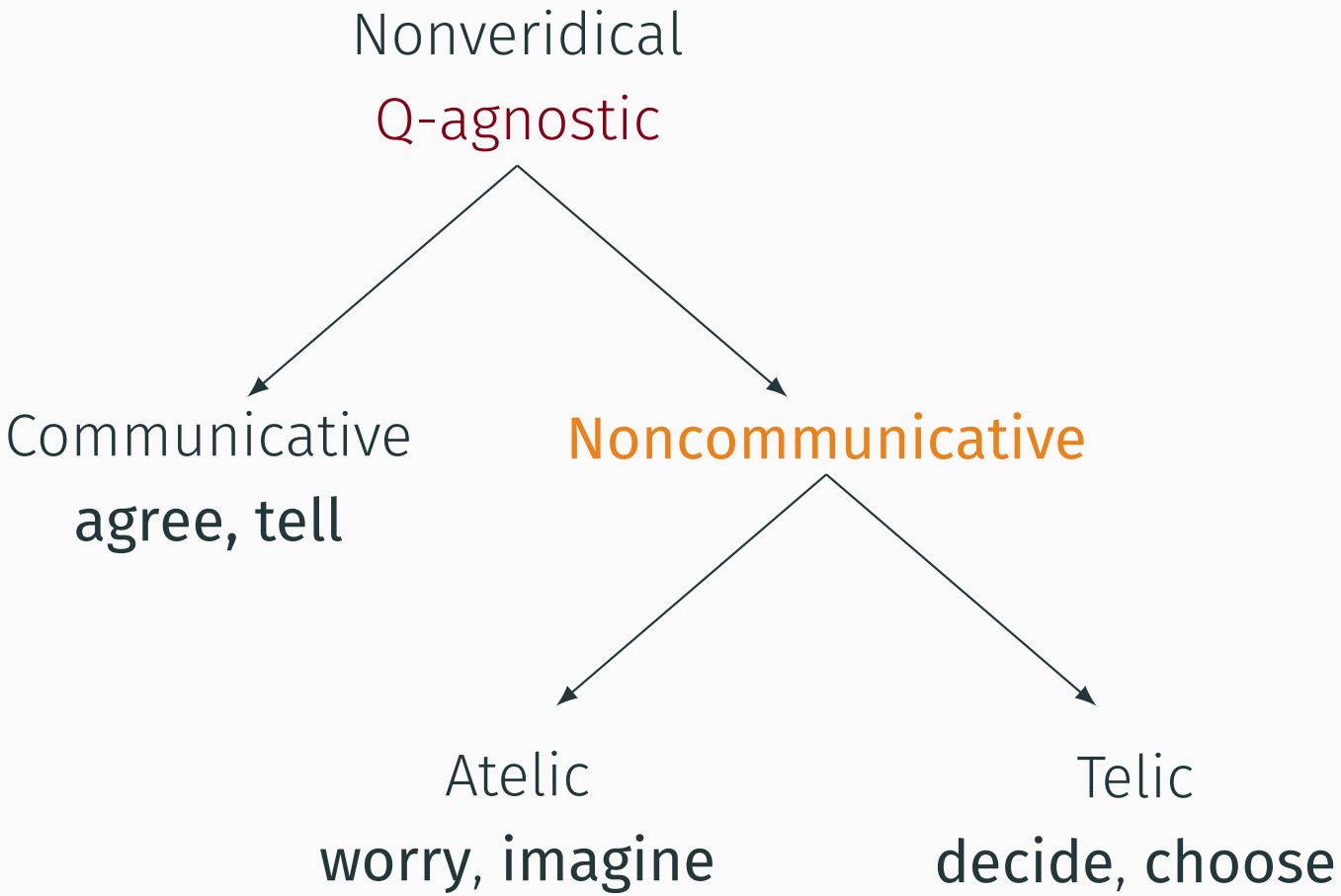
Regimenting nonveridical Q-agnostics



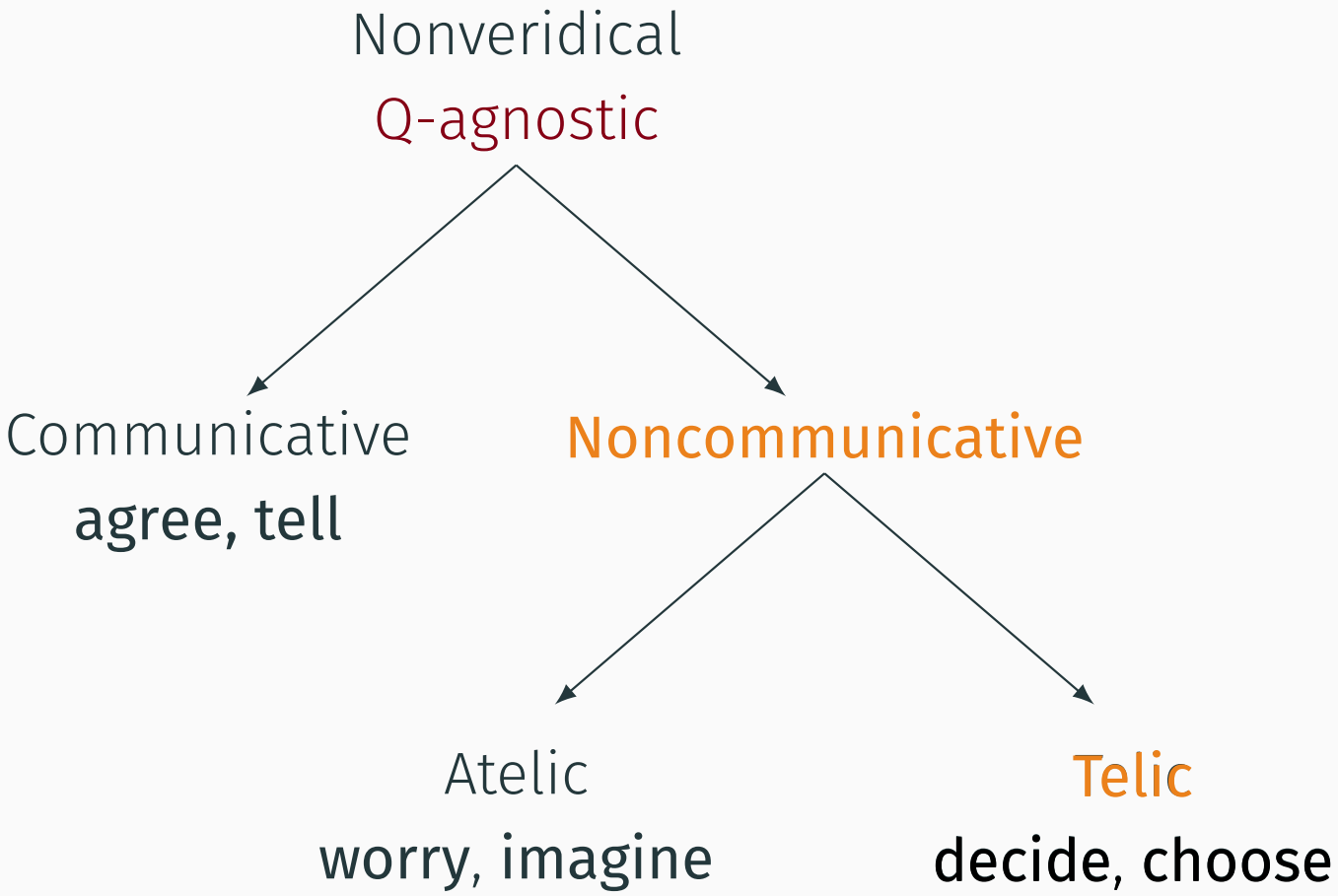
(cf. Anand & Hacquard 2014, White & Rawlins 2016)

Regimenting nonveridical Q-agnostics



(cf. Anand & Hacquard 2014, White & Rawlins 2016)

Regimenting nonveridical Q-agnostics



(cf. Anand & Hacquard 2014, White & Rawlins 2016)

Anand & Hacquard's (2014) proposal

Fundamental split

Communicatives characterize speech events that involve updates to a public **Common Ground** (cf. Farkas & Bruce 2009)

$$[\![\text{claim}]\!]^w = \lambda p.\lambda e.\textsc{claim}(e, w) \wedge [\forall w' \text{ compatible with } \textsc{goal}(e)] \\ ([\forall w'' \in CG(w')]\,(p(w'')))$$

Anand & Hacquard's (2014) proposal

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Communicatives characterize speech events that involve updates to a public **Common Ground** (cf. Farkas & Bruce 2009)

$$[\![\text{claim}]\!]^w = \lambda p.\lambda e.\textsc{claim}(e, w) \wedge [\forall w' \text{ compatible with } \textsc{goal}(e)] \\ ([\forall w'' \in CG(w')]\,(p(w'')))$$

Noncommunicatives make reference to private eventualities

$$[\![\text{believe}]\!]^w = \lambda p.\lambda e.\textsc{belief}(e, w) \wedge [\forall w' \text{ compatible with } e](p(w''))$$

Anand & Hacquard's (2014) proposal

Idea (Anand & Hacquard in prep)

1. Some communicatives also make reference to a Question Under Discussion (QUD) (Roberts 1996)

Anand & Hacquard's (2014) proposal

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2. Encoding of QUD is predictable from the kind of communicative act a verb characterizes

Anand & Hacquard's (2014) proposal

Idea (Anand & Hacquard in prep)

1. Some communicatives also make reference to a Question Under Discussion (QUD) (Roberts 1996)
2. Encoding of QUD is predictable from the kind of communicative act a verb characterizes
3. A communicative embeds interrogatives iff it explicitly represents QUDs

Possibility

Encoding of QUD may be (partially) predictable based on CoS

Thanks!

We'd like to thank the JHU Semantics Lab as well as Valentine Hacquard and Pranav Anand for helpful discussion.

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Appendix

Veridicality and selection

Egré's (2008) solution

1. Some apparently nonveridical communicatives have veridical variants (cf. Spector & Egré 2015)
2. All others embed questions only via prepositions

Egré's (2008) proposal

Evidence

Some nonveridical verbs can embed via prepositions

(53) a. Jo and Mo **agree** {on, about} whether Bo is alive.
b. Jo is still **deciding** {on, about} whether she will go.

Egré's (2008) proposal

Evidence

Some nonveridical verbs can embed via prepositions

(53) a. Jo and Mo **agree** {on, about} whether Bo is alive.
b. Jo is still **deciding** {on, about} whether she will go.

Assumption

A clause-embedding preposition can be silent

(54) Jo is still **deciding** ({on, about}) whether she will go.

Egré's (2008) proposal

Possible prediction

All Q-agnostic nonveridicals at least embed Qs via prepositions

Challenge

There are Q-agnostic nonveridicals that don't embed clauses via prepositions

(55) Jo **determined** {*on, *about} whether she would leave.

There are some complications with *about* (see Rawlins 2013)

Predictions for Q-agnosticism

Embedded interrogatives	Captured	Cost
True answers (K-GS questions)	Q-veridicals (*know*)	Q-nonveridicals (*agree*, *decide*)

Predictions for Q-agnosticism

Embedded interrogatives	Captured	Cost
True answers (K-GS questions)	Q-veridicals (*know*)	Q-nonveridicals (*agree*, *decide*)
True + possible answers	Both (*know*, *agree*, *decide*)	Must explain selection

Predictions for Q-agnosticism

Embedded interrogatives	Captured	Cost
True answers (K-GS questions)	Q-veridicals (*know*)	Q-nonveridicals (*agree*, *decide*)
True + possible answers	Both (*know*, *agree*, *decide*)	Must explain selection
Possible answers (Hamblin questions)	Q-nonveridicals (*agree*, *decide*)	Must explain Q-veridicals

A note on coordination

Argument

Declaratives and interrogatives can be coordinated, so their denotations must have the same type

(56) I **decided** that I would go to the store but not whether I would get apples.

A note on coordination

Question

Does XP *and* YP $\rightarrow$ **type**($[\![\text{XP}]\!]$) = **type**($[\![\text{YP}]\!]$)?

A note on coordination

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Does XP *and* YP $\rightarrow$ **type**($[\![\text{XP}]\!]$) = **type**($[\![\text{YP}]\!]$)?

(57) I **decided** to go to the store and that I would get apples.

A note on coordination

Question

Does XP *and* YP $\rightarrow$ **type**($[\![\text{XP}]\!]$) = **type**($[\![\text{YP}]\!]$)?

(57) I **decided** to go to the store and that I would get apples.

Conditional answer

If we're willing to say that infinitival denotations have the same type as declaratives, then maybe. But...

A note on coordination

Question

Does XP *and* YP $\rightarrow$ **type**($[\![\text{XP}]\!]$) = **type**($[\![\text{YP}]\!]$)?

(57) I **decided** to go to the store and that I would get apples.

Conditional answer

If we're willing to say that infinitival denotations have the same type as declaratives, then maybe. But...

(58) I remember leaving and that Mary left with me.

George's (2011) Twin Relations Theory

Elementary relations

$$\textsc{know}_{\forall} \equiv \lambda w.\lambda p.\lambda x.\textsc{believes}(w)(p)(x) \rightarrow p(w)$$

$$\textsc{know}_{\exists} \equiv \lambda w.\lambda p.\lambda x.\textsc{know}(w)(p)(x)$$

George's (2011) Twin Relations Theory

Elementary relations

$$\textsc{know}_{\forall} \equiv \lambda w.\lambda p.\lambda x.\textsc{believes}(w)(p)(x) \rightarrow p(w)$$

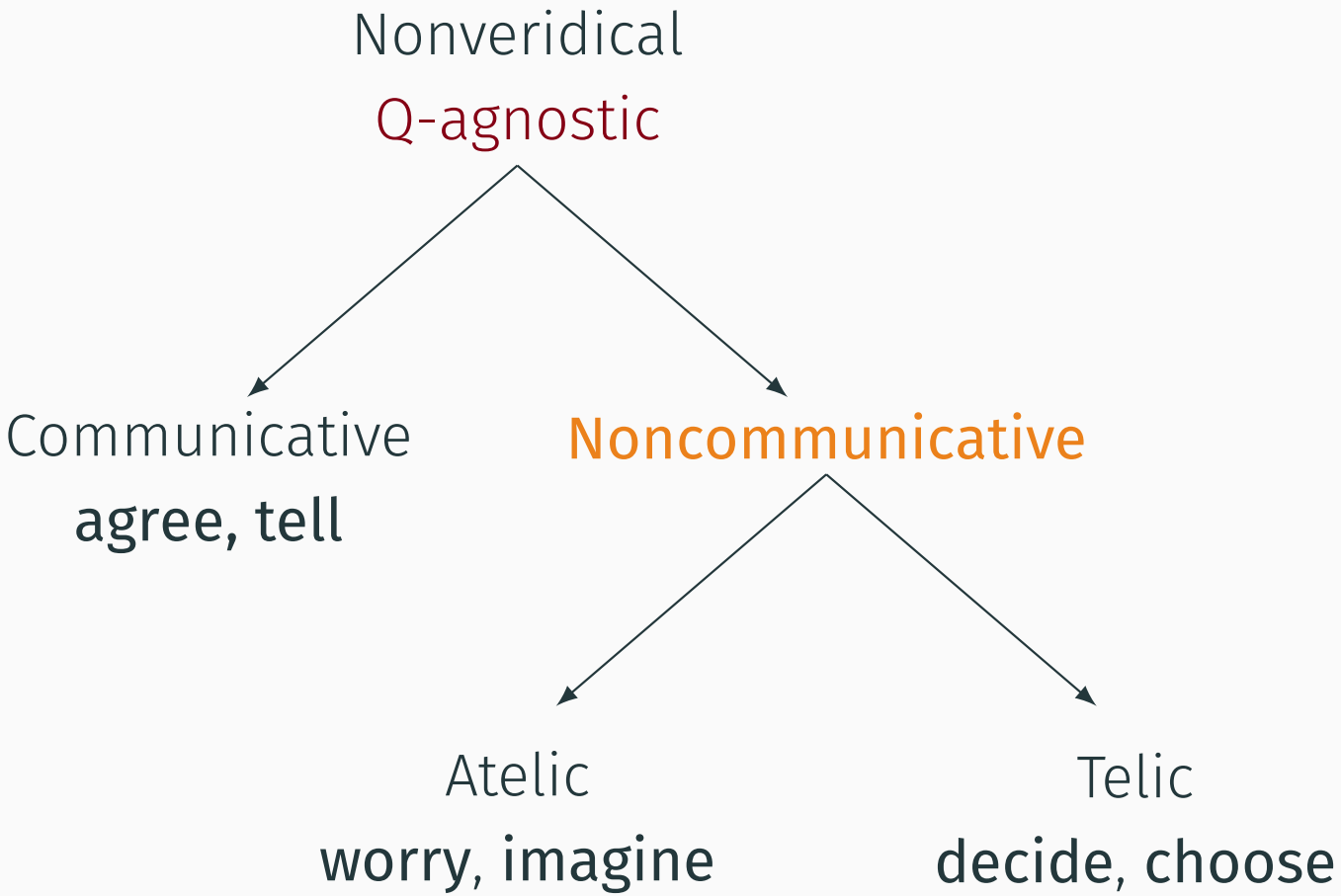
$$\textsc{know}_{\exists} \equiv \lambda w.\lambda p.\lambda x.\textsc{know}(w)(p)(x)$$

Lexicon

$$\textsc{know}_{\textsc{prop}} \equiv \lambda w.\lambda p.\lambda x.\textsc{know}_{\forall}(w)(p')(x) \wedge \textsc{know}_{\exists}(w)(p')(x)$$

$$\textsc{know}_{\textsc{ques}} \equiv \lambda w.\lambda Q.\lambda x.\forall p' \in Q : \textsc{know}_{\forall}(w)(p')(x) \wedge \exists p' \in Q : \textsc{know}_{\exists}(w)(p')(x)$$

Regimenting nonveridical Q-agnostics



(cf. Anand & Hacquard 2014, White & Rawlins 2016)

Explaining residuals

Observation 1

All atelic Q-agnostics are degraded with questions

(59) a. Jo imagined {that, ???whether} she could fly.
b. Jo worries {that, ???whether} Bo gets too little support.

Explaining residuals

Imagine Whether Or Not

1

I have this sentence using "*think*":

> I was ***thinking*** whether or not he has money that I can borrow.

is good English. If I replace "*think*" with "*imagine*":

> I was ***imagining*** whether or not he has money that I can borrow.

Would this be okay English?

interrogative free-relative-clauses

share improve this question

edited Oct 11 '15 at 18:38
StoneyB
128k 5 134 292

asked Sep 5 '14 at 16:01
meatie
3,100 4 10 41

They're both correct grammatically, but the sentences have different connotations. – TheIntern Sep 5 '14 at 16:08

@TheIntern I have a feeling that while "think" could be used with two or more posibilities, "imagine" can only be used with one possibility or the other? – meatie Sep 5 '14 at 16:15

1 "Think" can be used when there is only one possibility, like "I think he has money that I can borrow.". "Imagine" is more like you are fantasizing or dreaming. – TheIntern Sep 5 '14 at 16:18

Explaining residuals

1 Answer

active oldest votes

3

Neither *think* nor *imagine* is used this way with *whether*.

To *think* X is to hold it as a strong idea or opinion that X is true or happened, and to *imagine* it is to form and subsequently hold such an idea or opinion. These do not suit well with *whether*, which implies uncertainty between two or more ideas or opinions.

Ordinarily we ***wonder*** whether X is true, to indicate that we raise the question in our minds; or if we ponder the question deeply we **consider** or *think* ***about*** whether it is true.

share improve this answer

edited Sep 5 '14 at 18:01

answered Sep 5 '14 at 17:52

StoneyB

128k 5 134 292

+1 for **wonder**. Good suggestion! – Manish Sep 5 '14 at 18:01

"I'm going to think about whether or not he has money I can borrow." is valid to say, but has a different connotation. It suggests more that it's the thinker who will be making the decision--it doesn't express a curiosity. It's as if they were a puppetmaster of some kind, who will examine his assets and then make the decision; the lending will be happening or not on the thinker's terms. – HostileFork Sep 6 '14 at 0:02

@HostileFork I agree about 90%; but "thinking about" **could** be *Hmm - I know he just got a promotion...but then he also just got a girlfriend...and he's been talking about buying a house...but on the other hand he owes me a big favour, he wouldn't have gotten that promotion if I hadn't rewritten his report...and he never spends any money on clothes....* – StoneyB Sep 6 '14 at 0:20

But the pattern "***be thinking whether*** ...." could definitely be found in substantial numbers on google. – meatie Sep 6 '14 at 22:26

@meatie See this Google Ngram. It arose in the 1780s and surged in the early 19th century - by 1818 it was four or five times more common than *imagine* - but from 1820 on it declined rapidly and is now strictly colloquial. Avoid it. – StoneyB Sep 6 '14 at 23:13

Explaining residuals

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Explaining residuals

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All atelic Q-agnostics are degraded with questions

(59) a. Jo imagined {that, ???whether} she could fly.
b. Jo worries {that, ???whether} Bo gets too little support.

Observation 2

Insofar as they are good, they act like **doubt** (cf. Karttunen 1977b)

(60) a. Jo doubted whether Bo could fly.
b. → Jo doubted that Bo could fly.

Explaining residuals

Observation 1

All atelic Q-agnostics are degraded with questions

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b. Jo worries {that, ???whether} Bo gets too little support.

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Insofar as they are good, they act like **doubt** (cf. Karttunen 1977b)

(60) a. Jo doubted whether Bo could fly.
b. → Jo doubted that Bo could fly.

Observation 3

All(?) take subjunctive in languages that have it