Echo *wh*-questions: A scope analysis

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Two kinds of *wh*-questions

Canonical *wh*-questions: the addressee is asked to identify what a *wh*-phrase refers to.

(1) A: What did Ann see?
B: Ann saw a unicorn.

Echo *wh*-questions: the addressee is asked to identify what a wh-phrase refers to in a prior utterance.

(2) A: Ann saw a unicorn.
B: Ann saw **WHAT**?

Non-canonical properties

No movement

In English, canonical *wh*-questions are formed by moving *wh*-phrases. However, echo *wh*-questions don't involve *wh*-movement.

(3) What did Ann see?

(4) A: Ann saw a unicorn.
B: Ann saw **WHAT**?

Resist embedding

Canonical *wh*-questions can be embedded, but echo *wh*-questions cannot (Beck and Reis 2018).

(5) Peter knows where Johnston lived.

(6) A: Peter knows Johnston lived in the Forbidden City.
B: Peter knows Johnston lived **WHERE**?/*.

Higher-order questions

Canonical multiple *wh*-questions require all the *wh*-phrases be addressed in the answer.

(7) A: Who bought what?
B: Ann bought a laptop.

Echo *wh*-questions can be used to ask the addressee to repeat a *wh*-question. Echo *wh*-phrases are always addressed first (Sobin 2010).

(8) A: What did Ann buy?
B: What did **WHO** buy?
C: (i) Ann. ($\rightsquigarrow$ what did Ann buy?) (ii) #Ann bought a laptop.

Echo *wh*-questions can be a higher-order question, i.e., a question about the other question (Dayal 1996).

Imperatives

Echo *wh*-questions can ask the addressee to repeat imperatives (Ginzburg and Sag 2000; Beck and Reis 2018) .

(9) A: Let's move to Boston!
B: Let's move **WHERE**?

Canonical *wh*-questions cannot be formed based on imperatives.

(10) *Where let's move?

Scoping over force

Asking about utterances

Canonical *wh*-questions are seeking true **propositional answers**.

> What did Ann see? ⇝ what is the thing x s.t. 'Ann saw x' is true

Echo *wh*-questions are seeking previous **utterances** (cf. Ginzburg and Sag 2000).

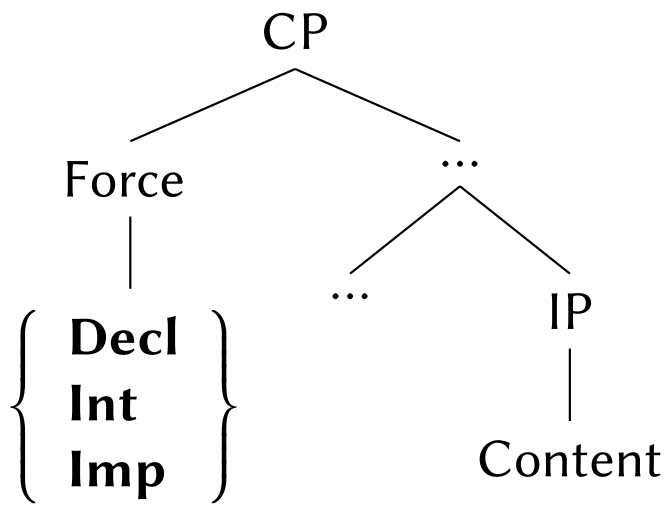
> What did **WHO** see? ⇝ what is the thing x s.t. 'what did x see' is previously uttered

Utterance = content + force

Generally, we have three types of illocutionary forces:

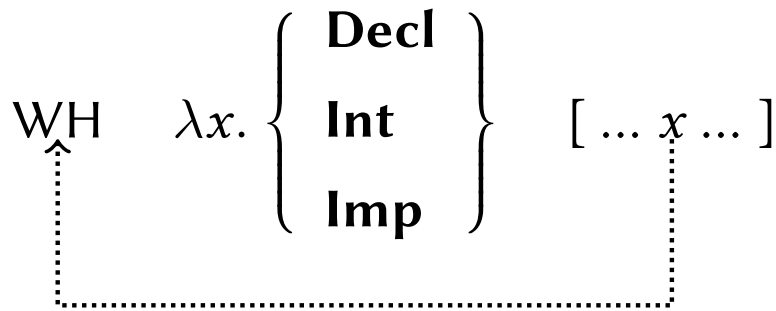
(11)	a.	Lee saw Ann.	Declarative
	b.	Who did Lee see?	Interrogative
	c.	Don't see Ann!	Imperative

A grammatical view: a force operator sits on the left periphery of a sentence, conveying the corresponding illocutionary force (Rizzi 1997, 2004).



Wh-phrases scope over force

The meaning of echo *wh*-questions is generated via letting *wh*-phrases scope over illocutionary force operators.



How to capture the non-canonical properties

1. **WHERE** $\lambda x.$ **Decl** (Peter knows Johnston lived x)

   $\rightsquigarrow$ what is the place x s.t. it's declared that Peter knows Johnston lives in x

2. **who** $\lambda x.$ **Int** (what did x buy)

   $\rightsquigarrow$ who is the person x s.t. it's asked what x buy?

3. **where** $\lambda x.$ **Imp** (let's move to x)

   $\rightsquigarrow$ what is the place x s.t. it's suggested that we move to x?

Issues

What is the relation of canonical *wh*-questions and echo *wh*-questions?

Island insensitivity: Challenging the scope analysis (Artstein 2002)

(12) [A:] Ann'll leave if Ann arrives. [B:] Ann'll leave if **WHO** arrives?

Metalinguistic inquiry (Janda 1985; Artstein 2002; Noh 1998)

(13) [A:] Bill is an orthodontist. [B:] Bill is a **WHAT**-dontist?

(14) a. *What$_1$ is Bill t_1-dontist?
b. *Who is what-dontist?

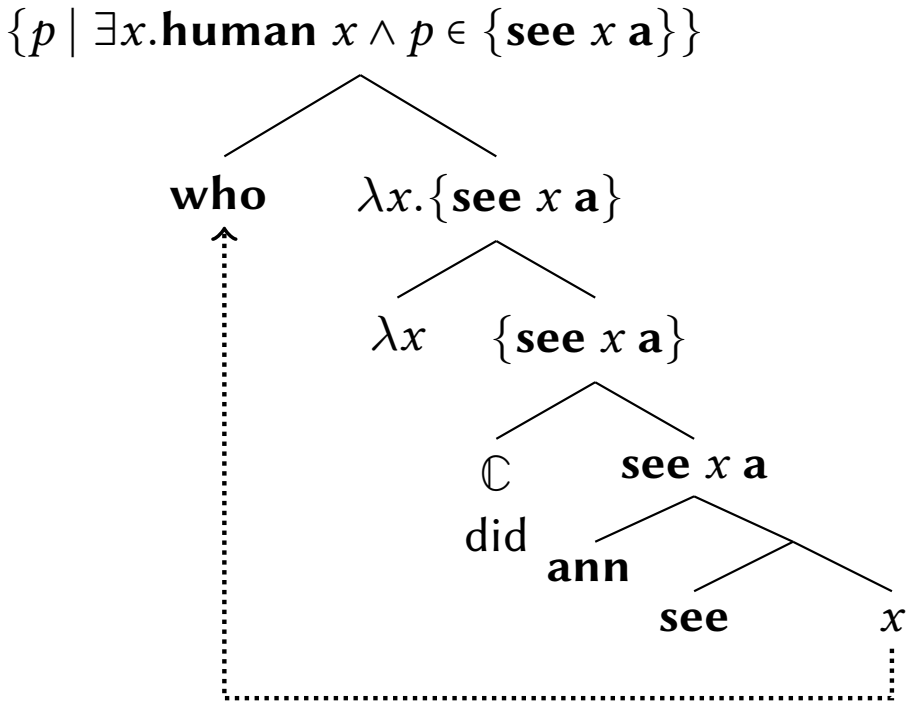
Generalized Karttunen semantics

Karttunen semantics

(15) $\mathbf{who} := \lambda f_{e \to \{p\}} . \overbrace{\{p \mid \exists x.\mathbf{human}\ x \wedge p \in f(x)\}}^{\{p\}}$

(16) $\mathbb{C} := \lambda p.\{p\}$

Karttunen (1977);
Cresti (1995)



Who did Ann see?

Generalizing Karttunen semantics

Karttunen semantics can be generalized so that *wh*-phrases can take scope at different positions.

Wh-phrases denote a set of alternatives (Hamblin 1973; Shimoyama 2006).

(17) $\mathbf{who} := \{x \mid \mathbf{human}\ x\}$

Alternatives can take scope! (Charlow 2014, to appear).

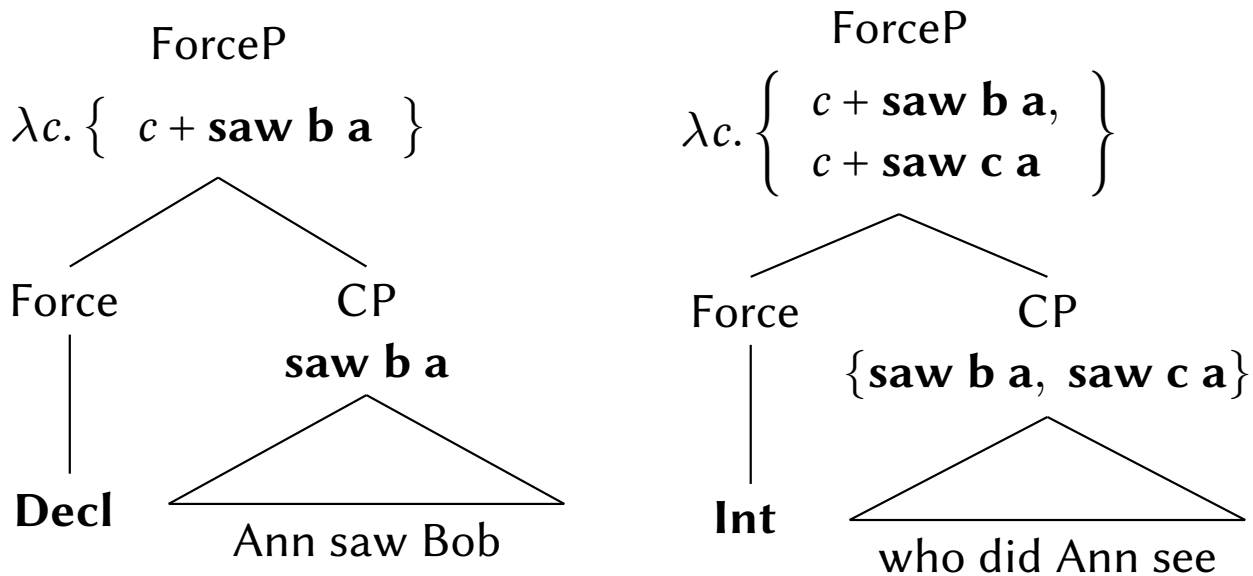
(18) $\mathbf{who}^{\gg} := \lambda f_{e \to \{a\}}.\ \overbrace{\bigcup \underbrace{\{f(x) \mid x \in \mathbf{who}\}}_{\{\{a\}\}}}^{\{a\}}$

Correspondingly, we have a generalized version of $\mathbb{C}$:

(19) $\eta := \lambda X_a.\{X\}$

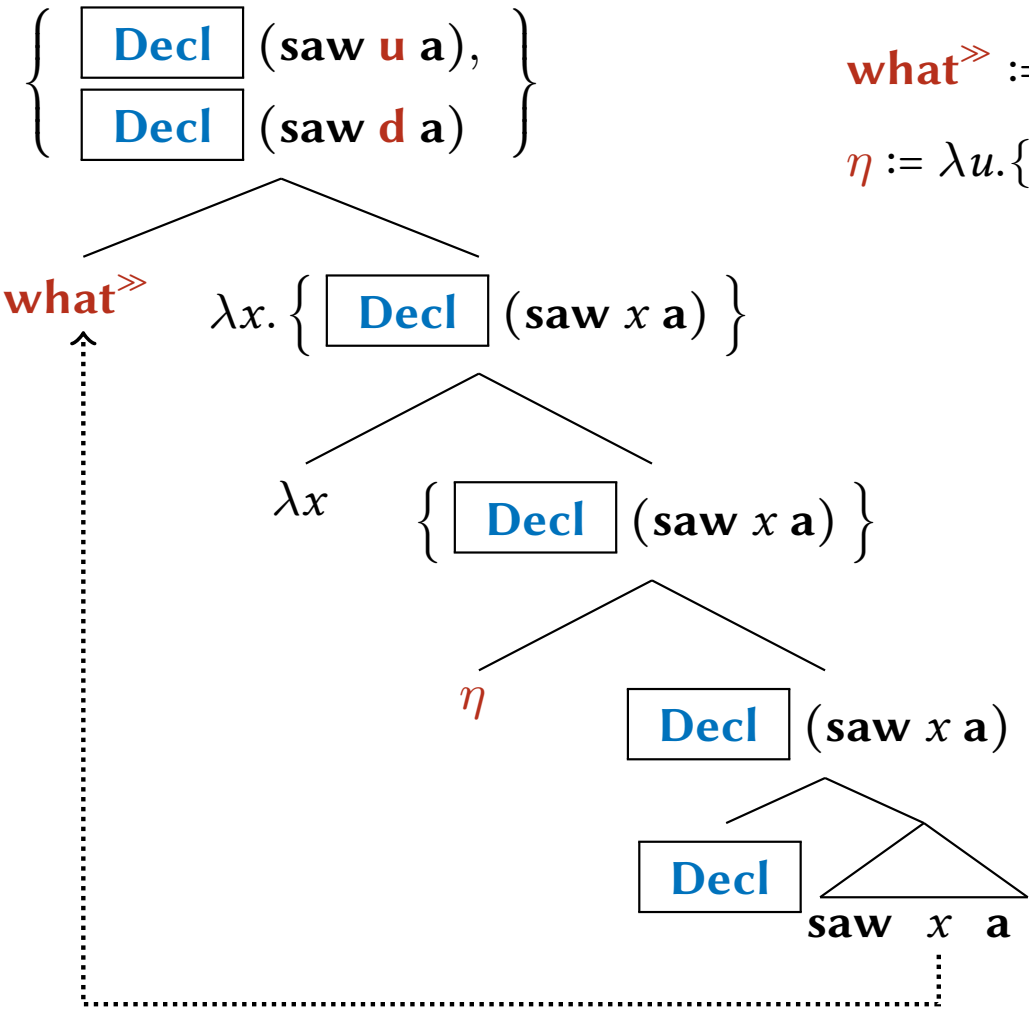
Declarative and Interrogative

Force operators take sentential contents and return context change potentials.



Stalnaker (1978); Davis (2011); Farkas and Bruce (2010); a.o.

Generating echo *wh*-questions



$$\textbf{what}^{\gg} := \lambda f_{e \to \{u\}}.\overbrace{\bigcup\{f(x) \mid x \in \{\textbf{u}, \textbf{d}\}\}}^{\{u\}};$$

$$\eta := \lambda u.\{u\}$$

Ann saw **WHAT**?

The Echo operator

The **echo** operator characterizes the answer to an echo question.

(20) [A:] Ann saw a unicorn [B:] Ann saw **WHAT**?

Decl ⟦Ann saw a unicorn⟧ **echo** { **Decl** ⟦Ann saw a unicorn⟧, **Decl** ⟦Ann saw a dragon⟧ }

anaphoric to

Echo is an answerhood operator (see also Dayal 1996).

(21) $\textbf{echo}_u\ U := U$ defined only if

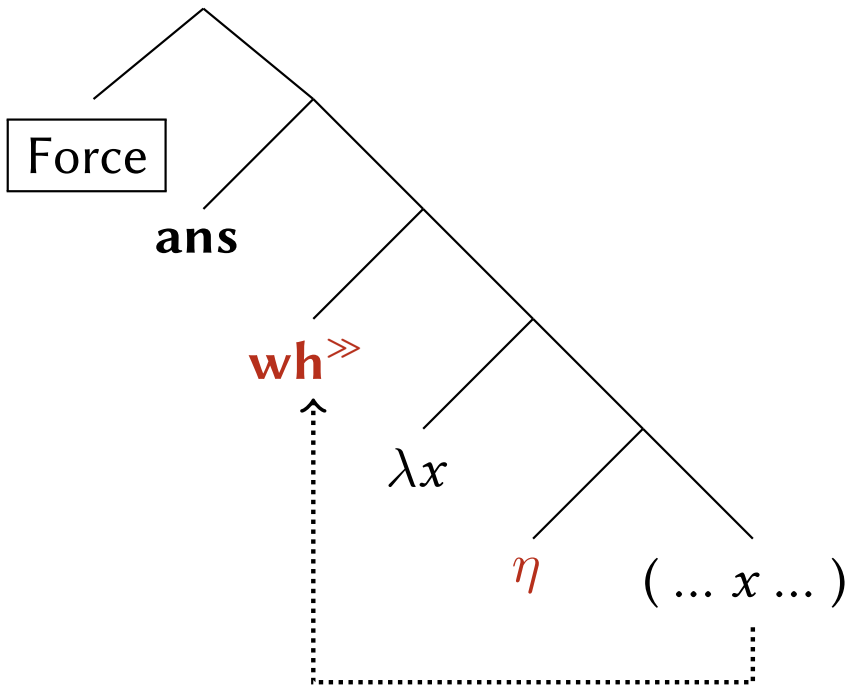
$\iota u'.u' \in U$ and the content of u' is entailed by that of u

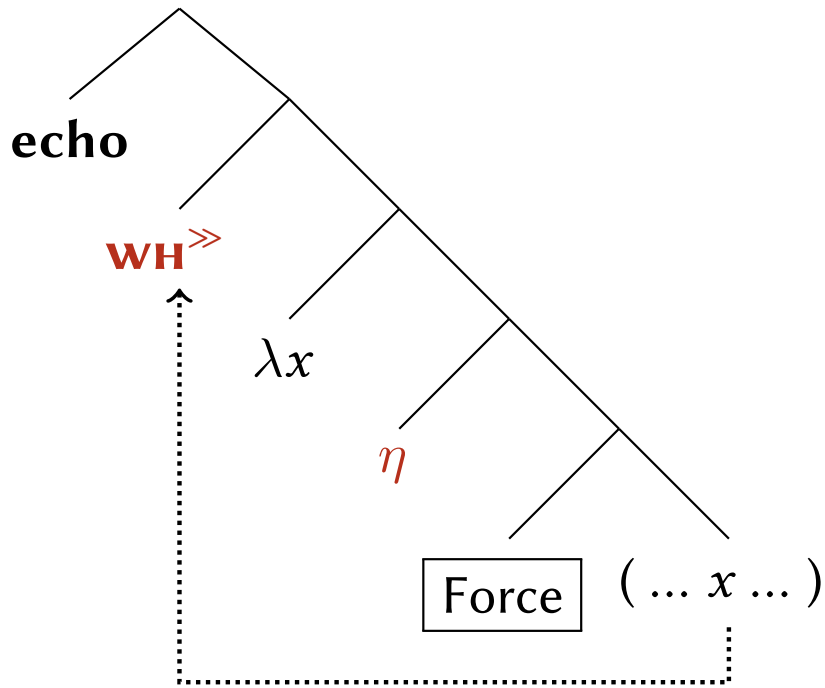
Compare with the answerhood operator in canonical questions:

(22) **ans** $Q := Q$ defined only if $\iota p.\ p \in Q$ and p completely resolves Q

Canonical vs. echo *wh*-questions

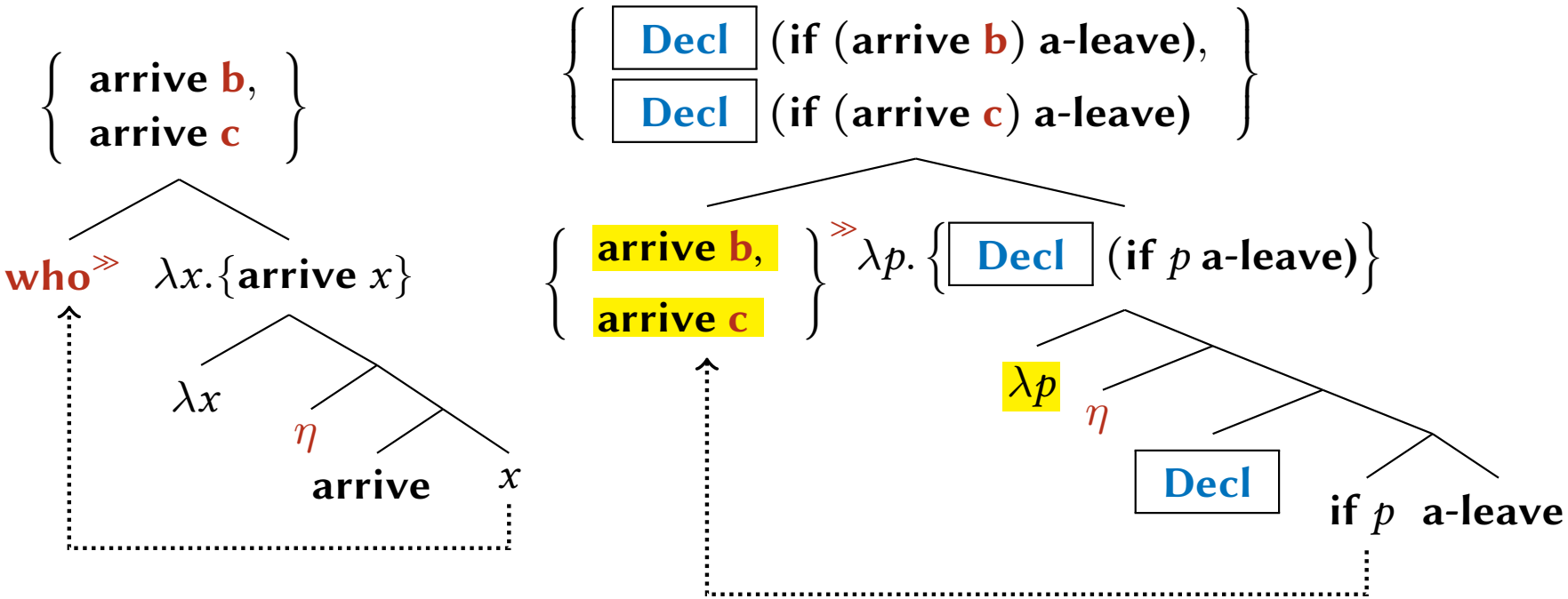
The essential difference between a canonical and an echo *wh*-question lies in where the *wh*-phrase takes scope.





Island insensitivity

In generalized Karttunen semantics, the island embedding a *wh*-phrase denotes a set, which can also take scope (Fiengo et al. 1988; Charlow 2014).



Ann will leave if WHO arrives?

Asking about quoted words

The *wh*-phrase *what* denotes a set of non-human entities, which can include (meaningless) sound strings (Artstein 2004).

Echo *wh*-questions can be used to ask part of a quoted word.

Bill is '**WHAT**-dontist'?

WHAT { ɔrθə / periɔ } $\lambda x.$ ('x-donist' $\lambda P.$ **Decl** (Bill is a P))

Note that the *wh*-phrase takes scope over the quoted word, which gives rise to a non-at-issue verbatim requirement and takes scope over Force (see also Barker et al. 2010).

In a canonical *wh*-question, the *wh*-phrase cannot scope over Force.

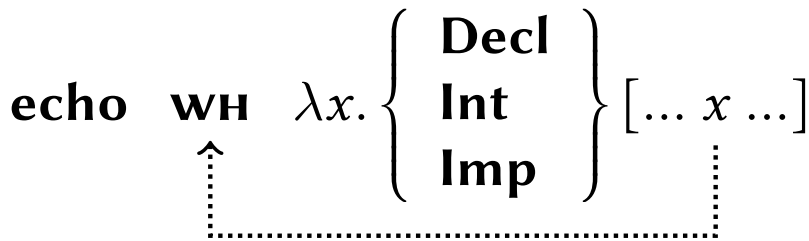
'x-dontist' $\lambda P.$ **Int** (what $\lambda x.$ (Bill is a P)) ✘

Conclusion and implication

Non-canonical and not-so-non-canonical

Echo *wh*-questions do express a non-canonical interrogation.

The non-canonical interrogation is generated with canonical compositionality.



Take-home message:

1. Echo *wh*-phrases are merely *wh*-phrases that take scope over force;
2. The denotation of an echo *wh*-question is a set of utterances;
3. The **echo** operator characterizes the answer to an echo *wh*-question.

Force: non-compositional vs. compositional

Frege (1956): the meaning of a sentence consists of two components

1. Content: truth-conditional meaning (semantics)
2. Force: how to use the content (pragmatics)
3. Sentence force is a **non-compositional** kind of meaning

This view is challenged by the present analysis in which *wh*-phrases can take scope over sentence force.

$$\textbf{wh} \quad \lambda x. \boxed{\text{Force}} \underbrace{[\ \ldots\ x\ \ldots\ ]}_{\text{content}}$$

The elements on the content level can **compositionally** interact with sentence force.

Thank you

Appendix

Mixed quotation

In natural language, a sentence can contain both quoted and non-quoted parts (Davidson 1976).

(23) Bush said he has an 'eckullectic' reading list.
$\rightsquigarrow$ Bush uttered the **word** *eckullectic*.

Quotation gives rise to a non-at-issue meaning, which affects a context in a different way from an at-issue meaning (Maier 2014; Koev 2017).

(24) **'eckullectic'** := $\lambda f \lambda c.(f$ **eclectic** $c)$ defined only if *eckullectic* is uttered in c

Quotation should take scope over the force operator, which introduces a context into composition (see also Barker et al. 2010).

$$\textbf{'eckullectic'}\ \lambda P.\ \underbrace{\boxed{\textbf{Decl}}\ (\text{Bill is a } P)}_{\lambda c.\{c{+}(P\ \mathbf{b})\}}$$

Evidence for the echo operator

In some languages, echo *wh*-questions are marked by a special sentence final particle, which can be seen as the realization of **echo**.

[Japanese]

(25) [A:] John-ga hikooki-o katta.
John airplane bought
'John bought an airplane.'

[B:] John-ga **NANI**-o katta **tte**?
John what bought Echo
'John bought **WHAT**?'

[Cantonese]

(26) [A:] Keoi gin-dou lung.
he saw dragon
'He saw a dragon.'

[B:] Keoi gin-dou **ME** **waa**?
he saw what Echo
'He saw **WHAT**?'

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