Japanese alternative questions and a unified in-situ semantics for *ka*

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slides available at: bit.ly/sub-ka

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Introduction: multi-functionality of Japanese *ka*

(1) Taro-ga utatta-**ka**
Taro-NOM sang-KA
'Did Taro sing?' Question particle (polar-Q)

(2) Dare-ga utatta-**ka**
who-NOM sang-KA
'Who sang?' Question particle (wh-Q)

(3) [Dare-**ka**]-ga utatta
who-KA -NOM sang
'Someone sang.' wh-indefinite

(4) [Taro-**ka** Jiro-**ka**]-ga utatta
Taro-KA Jiro-KA -NOM sang
'Taro or Jiro sang.' disjunctive statement

- Similar multi-functionality of Q-particles in different languages. E.g., Malayalam (Jayaseelan 2001), Sinhala (Slade 2010), Tlingit (Cable 2011), Hungarian (Szabolcsi 2014).

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Research questions

Overarching research question

How can we account for the multi-functionality of *ka* with a unified semantics?

I will tackle this question by addressing the following two sub-questions in turn:

1. **Explaining the two interpretations of *wh+ka***

   How can we account for the fact that *wh-ka* constructions give rise to *wh*-questions and indefinites, depending on the syntactic position of *ka*?

2. **Extending the analysis to the use of *ka* as a disj-marker**

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Previous accounts of *wh*+*ka*

Shimoyama (2006) assumes distinct lexical entries with distinct syntactic distributions for the ∃-*ka* and the Q-particle *ka*.

Hagstrom (1998) *ka* in *wh-ka* constructions has a uniform semantics (i.e., an existential quantifier over choice functions). Its overt distribution is constrained by whether the complementizer is $C_{[+int]}$ or $C_{[-int]}$. The choice of the complementizer also has different semantic consequences. (cf. Yatsushiro 2009)

- My goal is to propose a semantics that does *not* involve a semantic ambiguity either at *ka* or at the level of an operator that constrains the distribution of *ka*.
- It also turns out that both accounts cannot be properly extended to *ka*-disjunctions.

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Preview of the proposal

The semantics of *ka*

ka copies the set of alternatives in the alternative-semantic value of the prejacent to the ordinary-semantic value (Beck '06; Kotek '14').

Existential closure

The set of alternatives brought out by *ka* undergoes existential closure when it is semantically combined with a predicate that is incompatible with sets.

The semantics of *ka*-disjunctions

The *ka*-disjunction of the form α-*ka* β-*ka* denotes the set $\{\alpha, \beta\}$.

- Each *ka*-phrase denotes a singleton set: $\{\alpha\}$ and $\{\beta\}$.
- The structure of disjunctions involves a union: $\{\alpha\} \cup \{\beta\}$

- The multiple functions of *ka* fall out from the interaction of these three semantic components.

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Syntactic conditions on the interpretation of *wh-ka*

(5) a. [**Dare**-ka]-ga utatta.
who-KA -NOM sang
'Someone sang.' ∃-statement

b. **Dare**-ga utatta-ka.
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(6) a. Taro-ga [**nani**-ka] -o mita.
Taro-NOM what-KA -ACC saw
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b. Taro-ga **nani**-o mita-ka
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- The *ka*-phrase is **smaller than a CP** ⇒ ∃-statement
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Syntactic conditions on the interpretation of α-*ka* β-*ka*.

- Syntactically, *ka*-disjunctions can be either DP, TP or CP (Kishimoto 2013; Uegaki 2014; Miyama 2015)

(7) [$_{DP}$[Taro-ka] [Jiro-ka]]-ga utatta
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(8) [$_{TP}$[Taro-ga utatta-ka] [Jiro-ga utatta-ka]] mitai-da
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(9) [$_{CP}$[Taro-ga utatta-ka] [Jiro-ga utatta-ka]]
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Generalization across two constructions

	smaller than a CP	**CP**
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Table: Summary of the data

Generalization: the position of *ka* determines the interpretation of *ka*-phrases

When the *ka*-phrase is smaller than a CP, it gives rise to an existential statement. On the other hand, when it forms the a CP, it gives rise to a question associated with alternatives contributed by the wh-item/disjunction.

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Analysis in a nutshell

- Semantic composition in two tiers (Rooth 1985; Beck 2006, a.o.):
  - o(rdinary-semantic) value
  - alt(ernative-semantic) value (sets)
- *ka* always copies the set of alternatives in the alt-value of the prejacent to the o-value.
- Predicates are divided into two classes:
  - Set-compatible predicates: *know*, *tell*, *ask*...
  - Set-*in*compatible predicates: *sing*, *believe*, *seem*
- A *ka*-phrase as a sub-CP item is...
  - by itself incompatible with a CP-internal predicate (which are always set-incompatible).
  - The existential closure $\exists$ as a repair.
- A *ka*-phrase as a CP...
  - expresses a question by itself. Or, it can be embedded under set-compatible clause-embedding predicates.
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Lexical entries

(10) *ka* 'copies' the set in the alt-value to the o-value

a. $[\![\alpha \text{ ka}]\!]^o = [\![\alpha]\!]^{alt}$ b. $[\![\alpha \text{ ka}]\!]^{alt} = \{ [\![\alpha]\!]^{alt} \}$

(11) wh-items introduce sets of alternatives in the alt-value

a. $[\![\text{dare}]\!]^o = \text{undefined}$ b. $[\![\text{dare}]\!]^{alt} = \{x \mid x \in \textbf{human}\}$

(12) Set-incompatible predicates

a. $[\![\text{utatta}]\!]^o = \lambda x_e.\textbf{sang}(x)$

b. $[\![\text{utatta}]\!]^{alt} = \{\lambda x_e.\textbf{sang}(x)\}$

(13) Set-compatible predicates (New type $\{\sigma\}$: a set of σ objects)

a. $[\![\text{shitteiru}]\!]^o = \lambda Q_{\{\langle s,t\rangle\}}\lambda x.\textbf{know}(x, Q)$

b. $[\![\text{shitteiru}]\!]^{alt} = \{\lambda Q_{\{\langle s,t\rangle\}}\lambda x.\textbf{know}(x, Q)\}$

(14) Existential closure

a. $[\![\exists]\!]^o = \lambda Q_{\{\sigma\}}\lambda P_{\langle\sigma,t\rangle}.\exists x \in Q[P(x)]$

b. $[\![\exists]\!]^{alt} = \{\lambda Q_{\{\sigma\}}\lambda P_{\langle\sigma,t\rangle}.\exists x \in Q[P(x)]\}$

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b. $[\![\text{utatta}]\!]^{alt} = \{\lambda x_e.\textbf{sang}(x)\}$

(13) Set-compatible predicates (New type $\{\sigma\}$: a set of σ objects)

a. $[\![\text{shitteiru}]\!]^o = \lambda Q_{\{\langle s,t\rangle\}}\lambda x.\textbf{know}(x, Q)$

b. $[\![\text{shitteiru}]\!]^{alt} = \{\lambda Q_{\{\langle s,t\rangle\}}\lambda x.\textbf{know}(x, Q)\}$

(14) Existential closure

a. $[\![\exists]\!]^o = \lambda Q_{\{\sigma\}}\lambda P_{\langle\sigma,t\rangle}.\exists x \in Q[P(x)]$

b. $[\![\exists]\!]^{alt} = \{\lambda Q_{\{\sigma\}}\lambda P_{\langle\sigma,t\rangle}.\exists x \in Q[P(x)]\}$

Lexical entries

(10) *ka* 'copies' the set in the alt-value to the o-value

a. $[\![\alpha \text{ ka}]\!]^o = [\![\alpha]\!]^{alt}$ b. $[\![\alpha \text{ ka}]\!]^{alt} = \{ [\![\alpha]\!]^{alt} \}$

(11) wh-items introduce sets of alternatives in the alt-value

a. $[\![\text{dare}]\!]^o = \text{undefined}$ b. $[\![\text{dare}]\!]^{alt} = \{x \mid x \in \textbf{human}\}$

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Semantic composition rules

- The semantic composition is done by FA or Point-wise FA.

(15) a. **Functional Application (FA)**

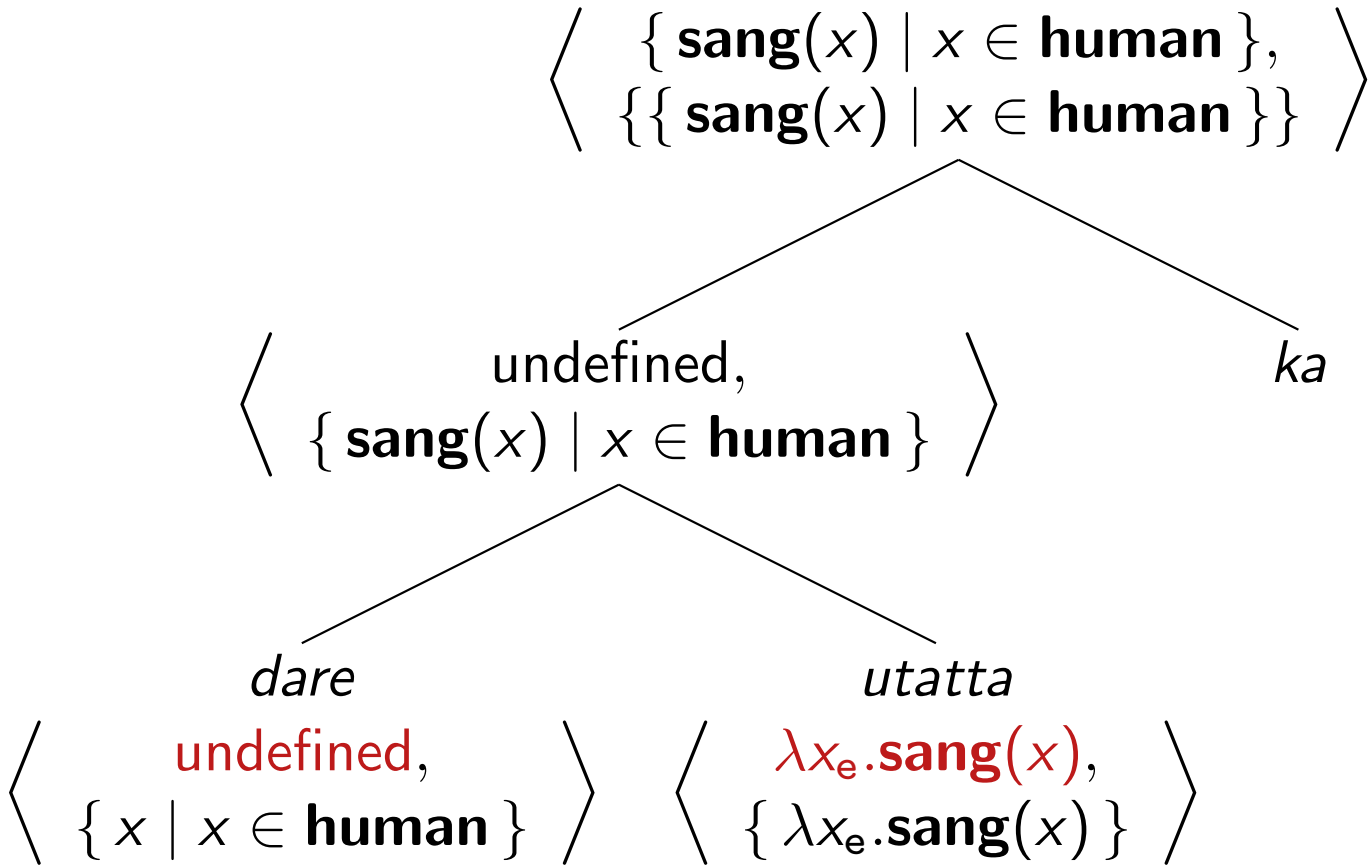
If the node α has $\{\beta, \gamma\}$ as the set of its daughters and $[\![\beta]\!]^o \in D_\sigma$ and $[\![\gamma]\!]^o \in D_{\langle\sigma,\tau\rangle}$, then $[\![\alpha]\!]^o = [\![\gamma]\!]^o([\![\beta]\!]^o)$.

b. **Point-wise Functional Application (PWFA)**

If the node α has $\{\beta, \gamma\}$ as the set of its daughters and $[\![\beta]\!]^{alt} \subseteq D_\sigma$ and $[\![\gamma]\!]^{alt} \subseteq D_{\langle\sigma,\tau\rangle}$, then $[\![\alpha]\!]^{alt} = \{\, a \mid \exists f \in [\![\gamma]\!]^{alt} \exists b \in [\![\beta]\!]^{alt} [a = f(b)] \,\}$.

Illustration: *wh-ka* as a CP

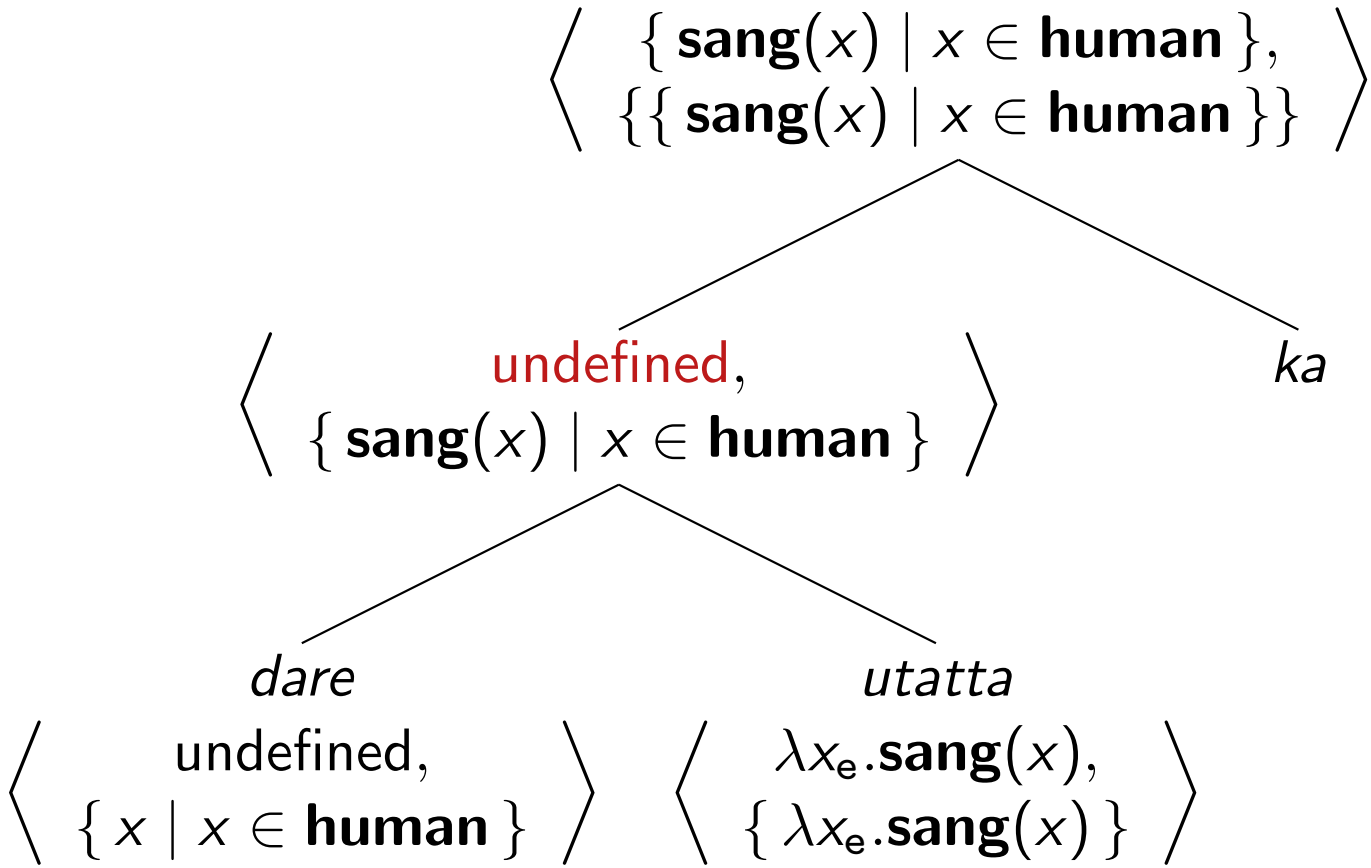
(16)



(cf. Beck 2006; Kotek 2014)

Illustration: *wh-ka* as a CP

(16)



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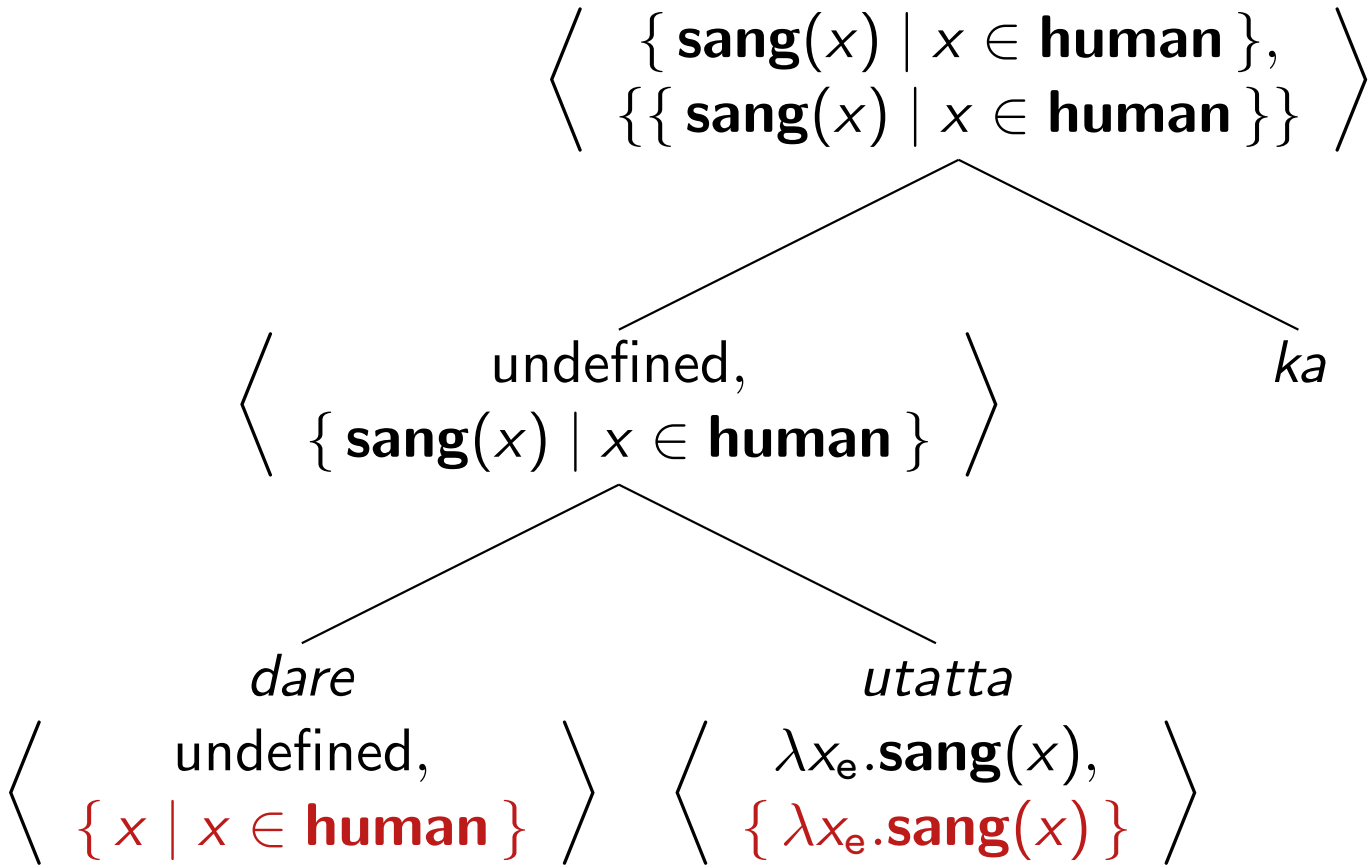

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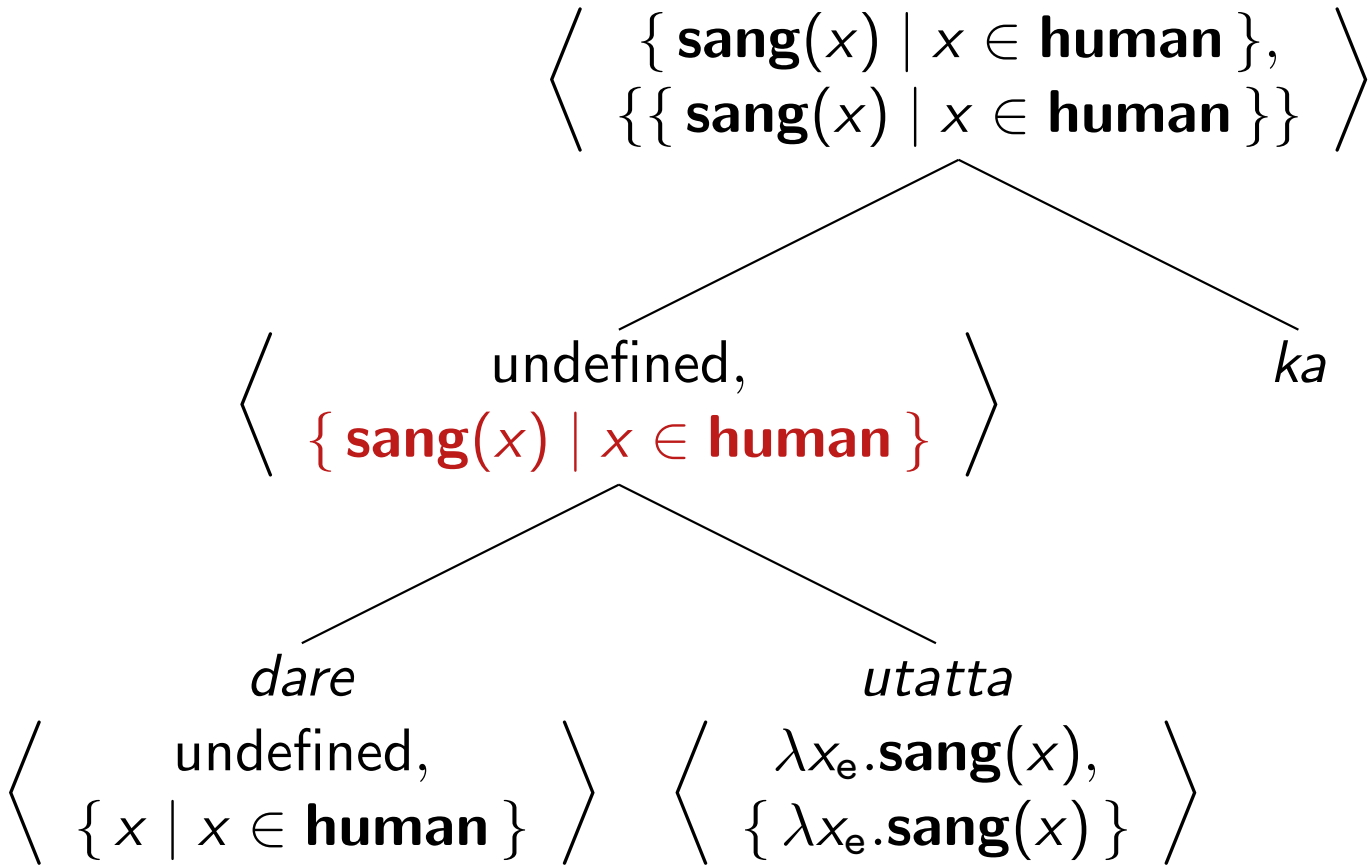

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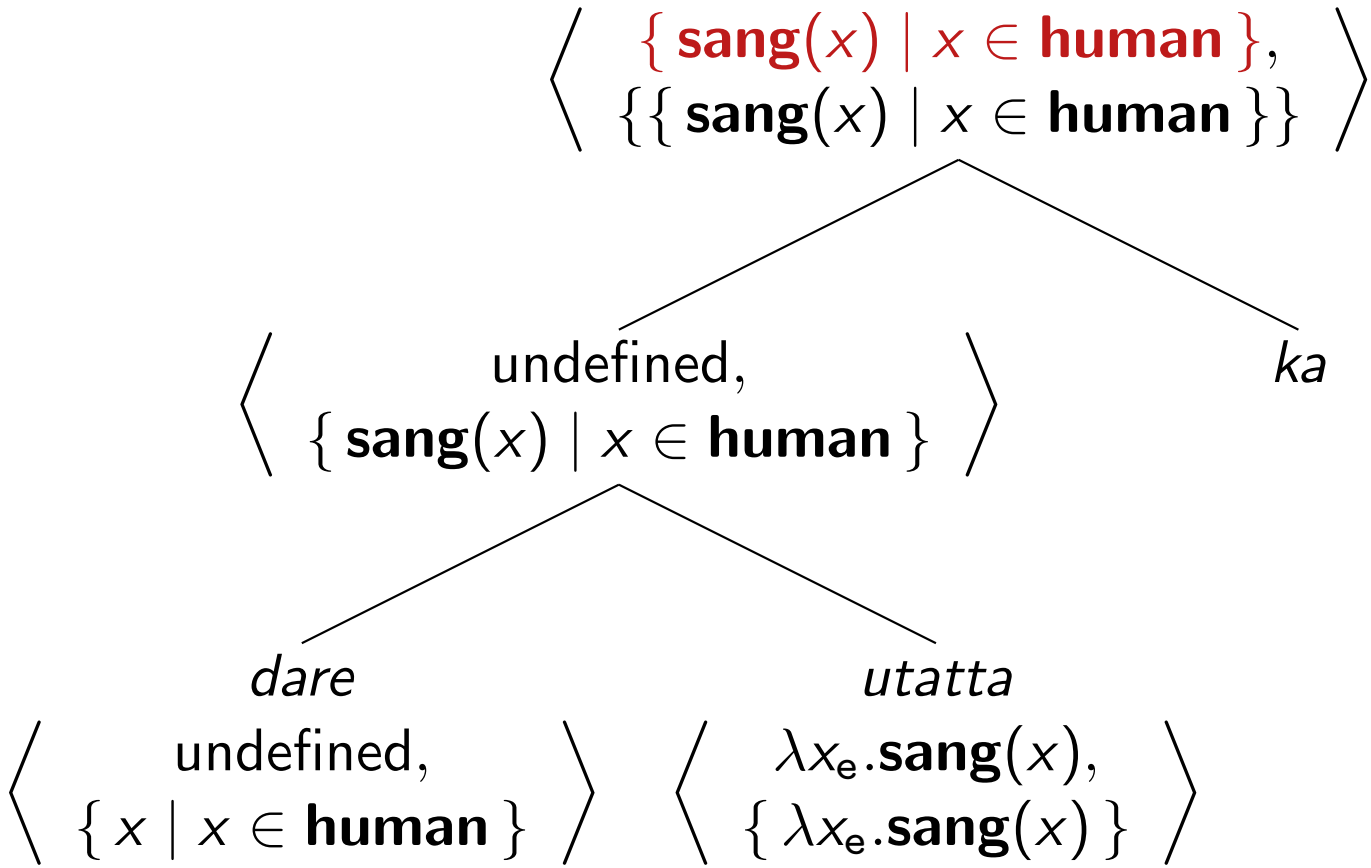

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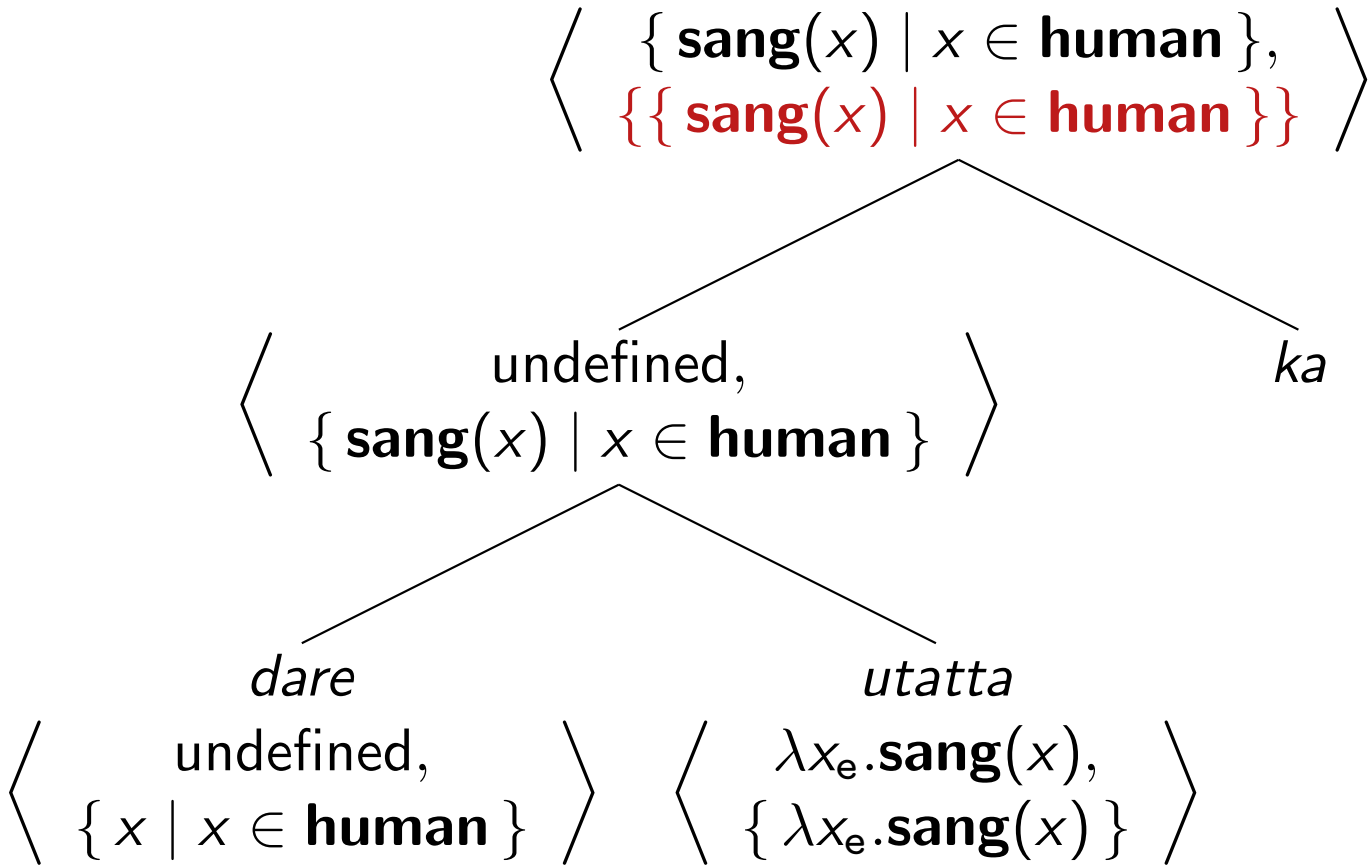

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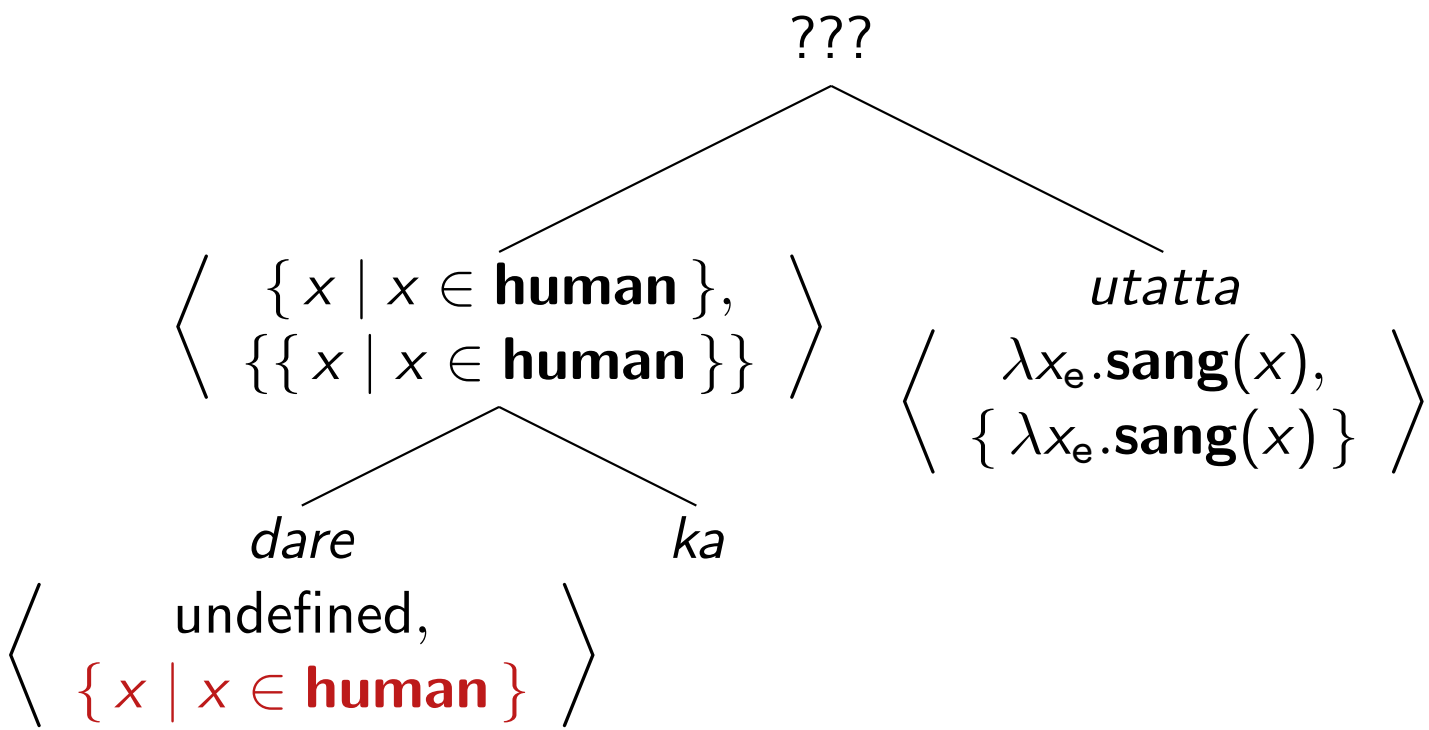
Illustration: *wh-ka* as a sub-CP (i)

(17)



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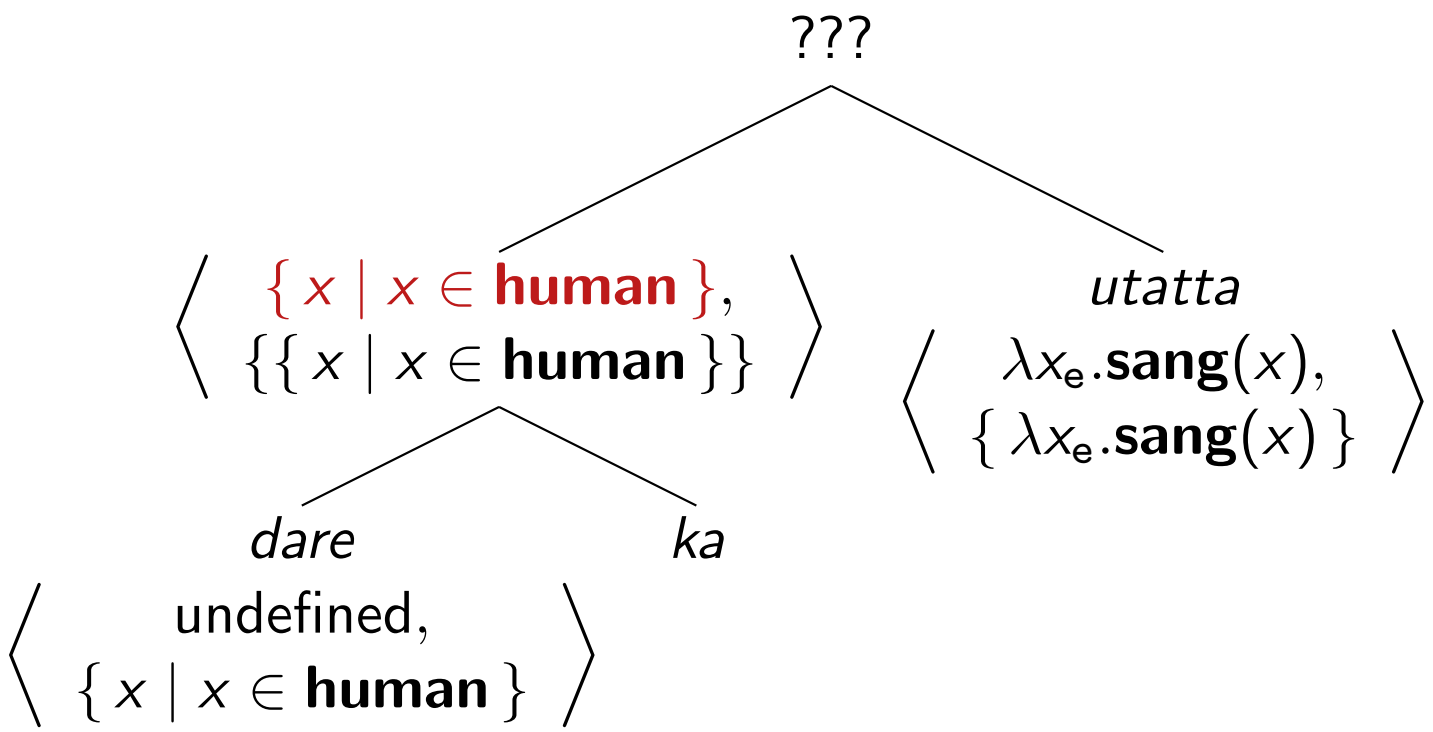

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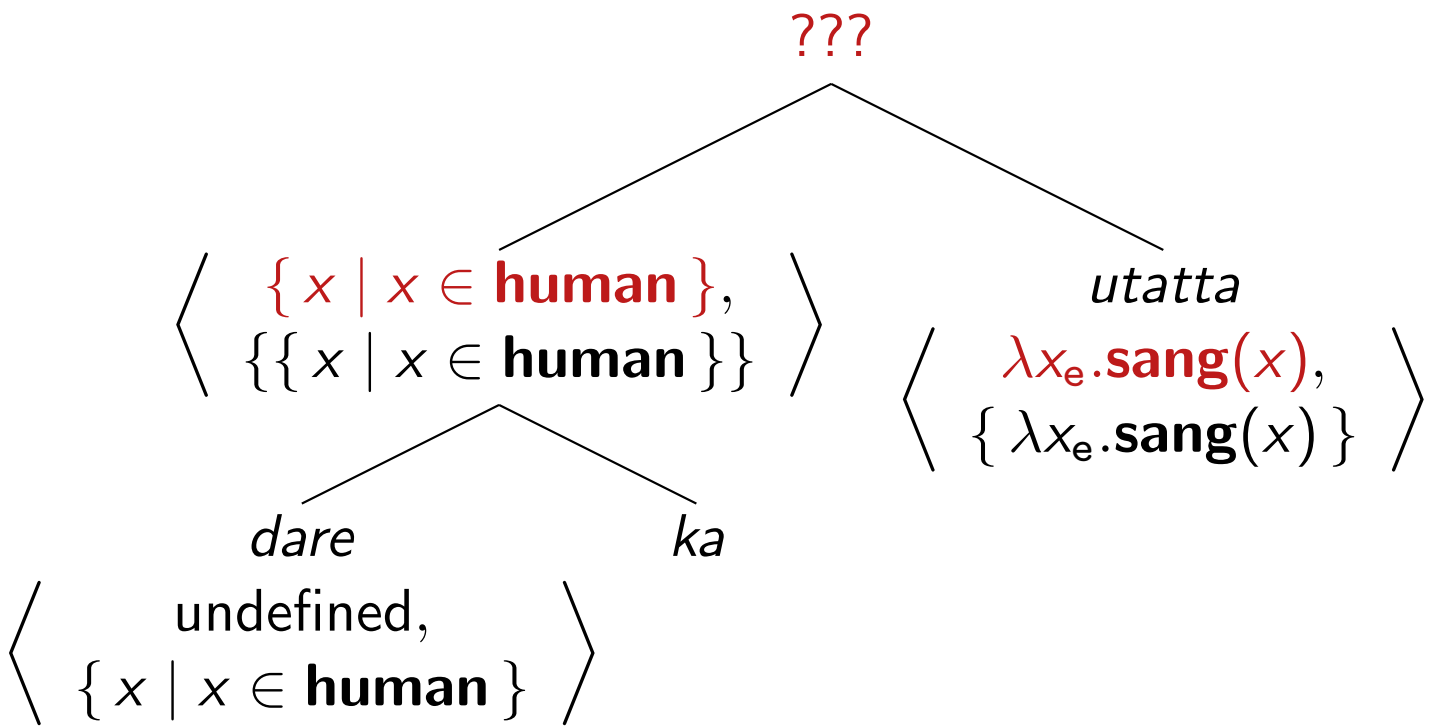

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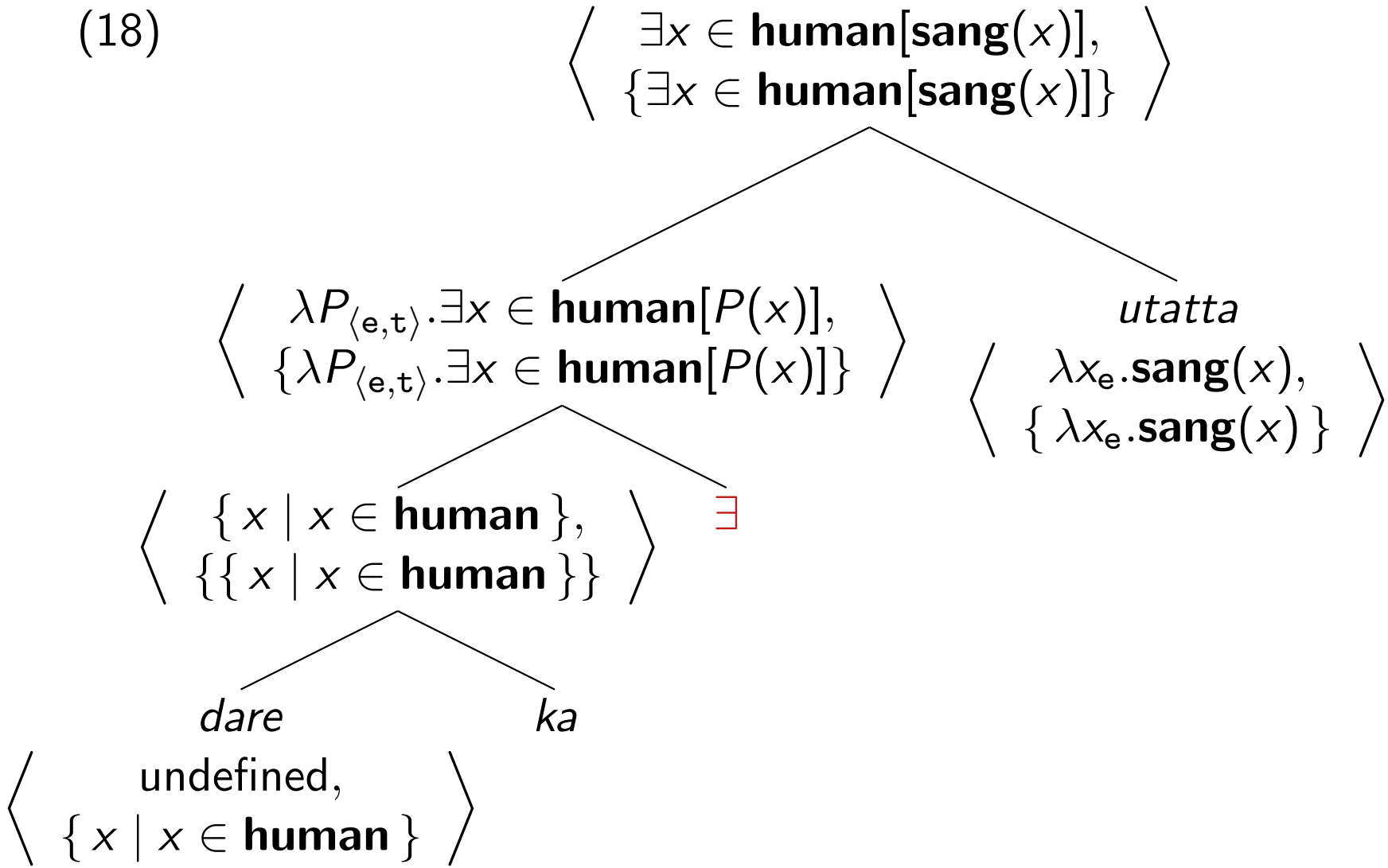

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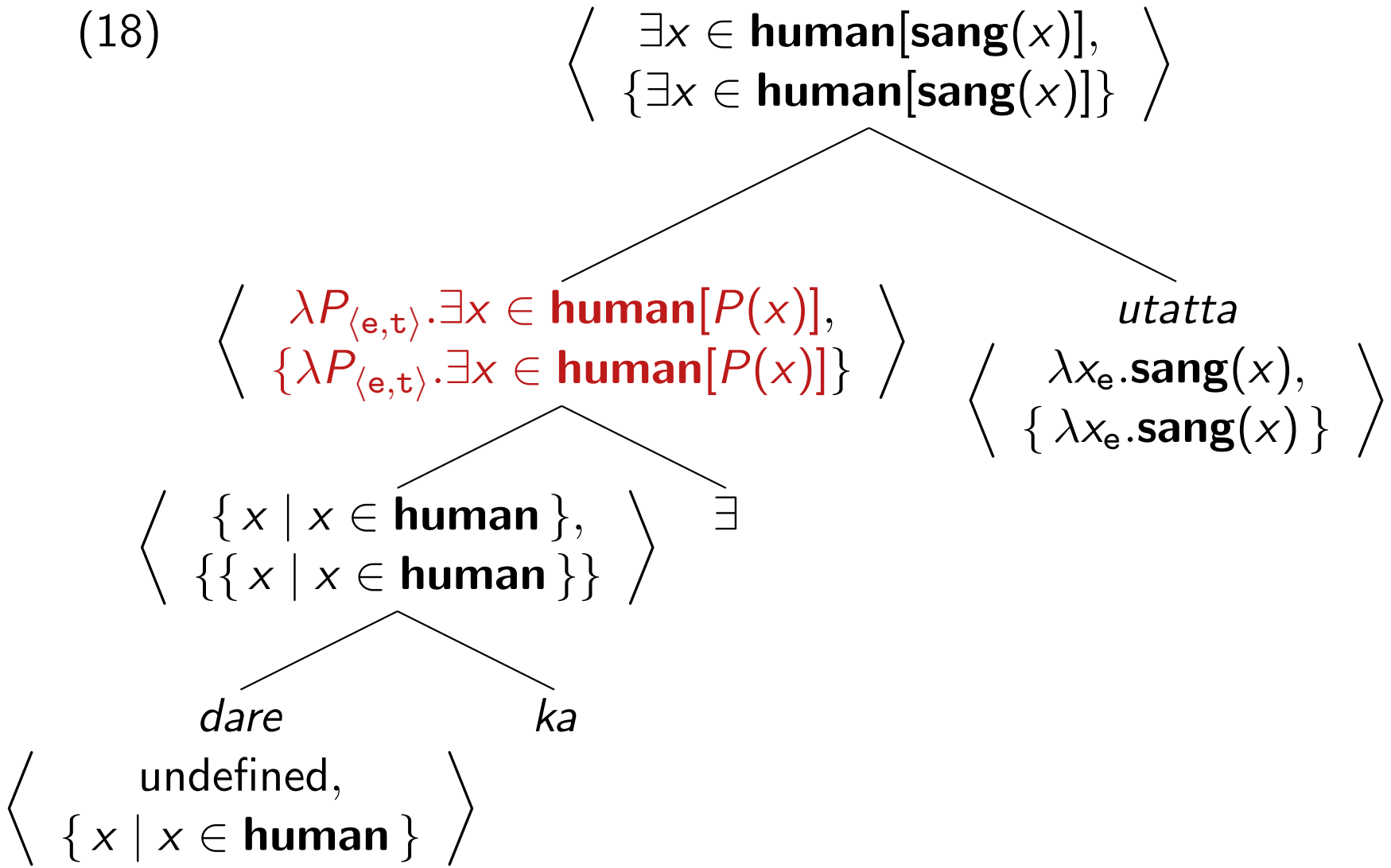

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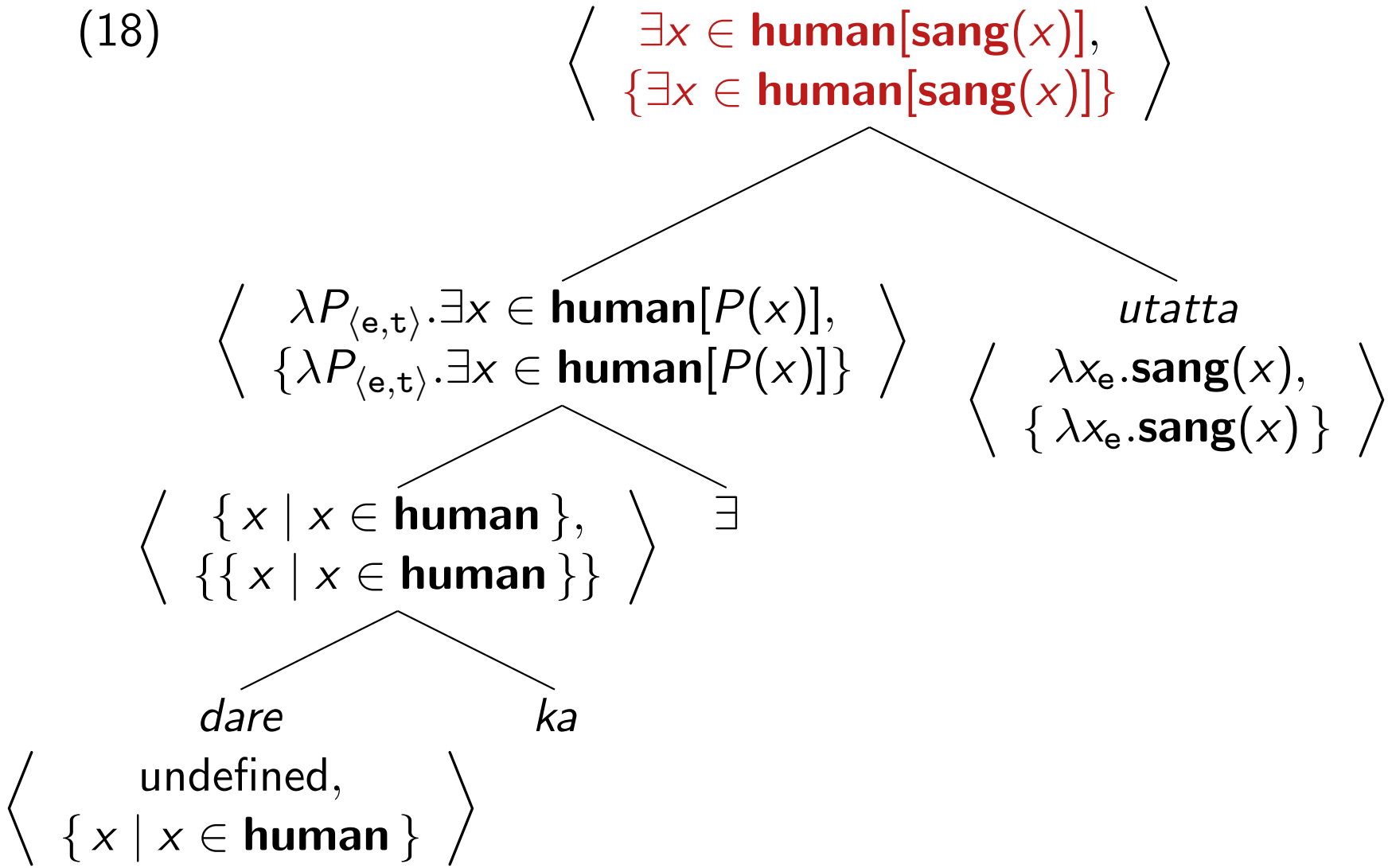

Constraining the distribution of ∃

- If ∃ is freely available, we would predict a matrix CP *wh-ka* to give rise to an ∃-statement optionally.
- This is empirically incorrect: matrix CP *wh-ka* is always a question.

Existential closure as a repair of type-mismatch

The application of ∃ is allowed only as a repair of a type-mismatch.

- Since a CP-*wh-ka* does not involve a type-mismatch, ∃ is not allowed.
- What if a CP-*wh-ka* is embedded under non-question-taking (i.e., set-incompatible) predicates (e.g., *believe*)? I will come back to this issue later.

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Accounting for *ka* as a polar-Q particle

(19) Taro-ga utatta-ka
Taro-NOM sang-KA
'Did Taro sing?' polar-Q

(20) $[\![(19)]\!]^o = \{\mathbf{sang(t)}\}$ (Roberts '96; Biezma & Rawlins '12, a.o.)

- The interrogative operator $\langle ? \rangle$ 'ensures' multiplicity of alternatives. (Roelofsen & Farkas 2015)

(21) $$[\![\langle ? \rangle \varphi]\!]^o = \begin{cases} [\![\varphi]\!]^o & \text{if } |[\![\varphi]\!]^o| > 1 \\ [\![\varphi]\!]^o \cup \{\neg \bigcup [\![\varphi]\!]^o\} & \text{if } |[\![\varphi]\!]^o| = 1 \end{cases}$$

(22) $[\![\langle ? \rangle (19)]\!]^o = \{\mathbf{sang(t)}, \neg\mathbf{sang(t)}\}$

- I assume that $\langle ? \rangle$ *is* the interrogative complementizer, syntactically positioned above *ka*.

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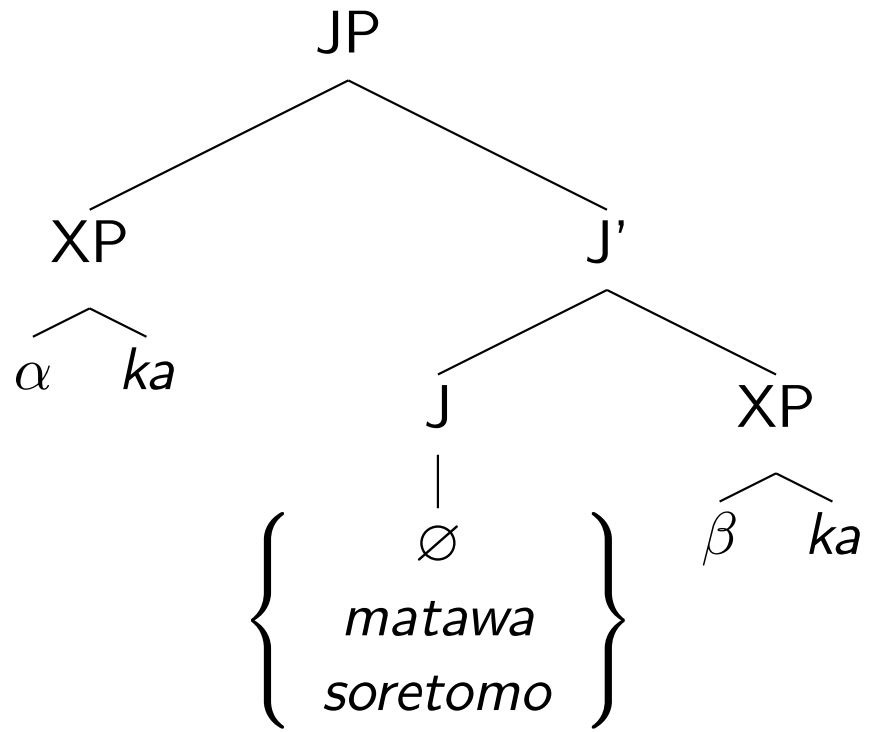
Outline

The structure of *ka*-disjunctions

(23)



(den Dikken 2006; Slade 2011; Mitrović & Sauerland 2014; Szabolcsi 2015)

The interpretation of *ka*-disjunctions

(24) The J head ∅ denotes the union operation

a. $[\![\varnothing]\!]^o = \lambda X_{\{\sigma\}} \lambda Y_{\{\sigma\}} . X \cup Y$

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(25) Some examples

a. $[\![[\text{Taro-ka}]_{DP} \varnothing [\text{Jiro-ka}]_{DP}]\!]^o = \{\mathbf{t}\} \cup \{\mathbf{j}\} = \{\mathbf{t}, \mathbf{j}\}$

b. $[\![[\text{Taro-ga utatta-ka}]_{CP} \varnothing [\text{Jiro-ga utatta-ka}]_{CP}]\!]^o$
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- In (25b), we already see how a CP-*ka*-disjunction gives rise to a semantic representation of an alt-Q, i.e., a set of alternative propositions.

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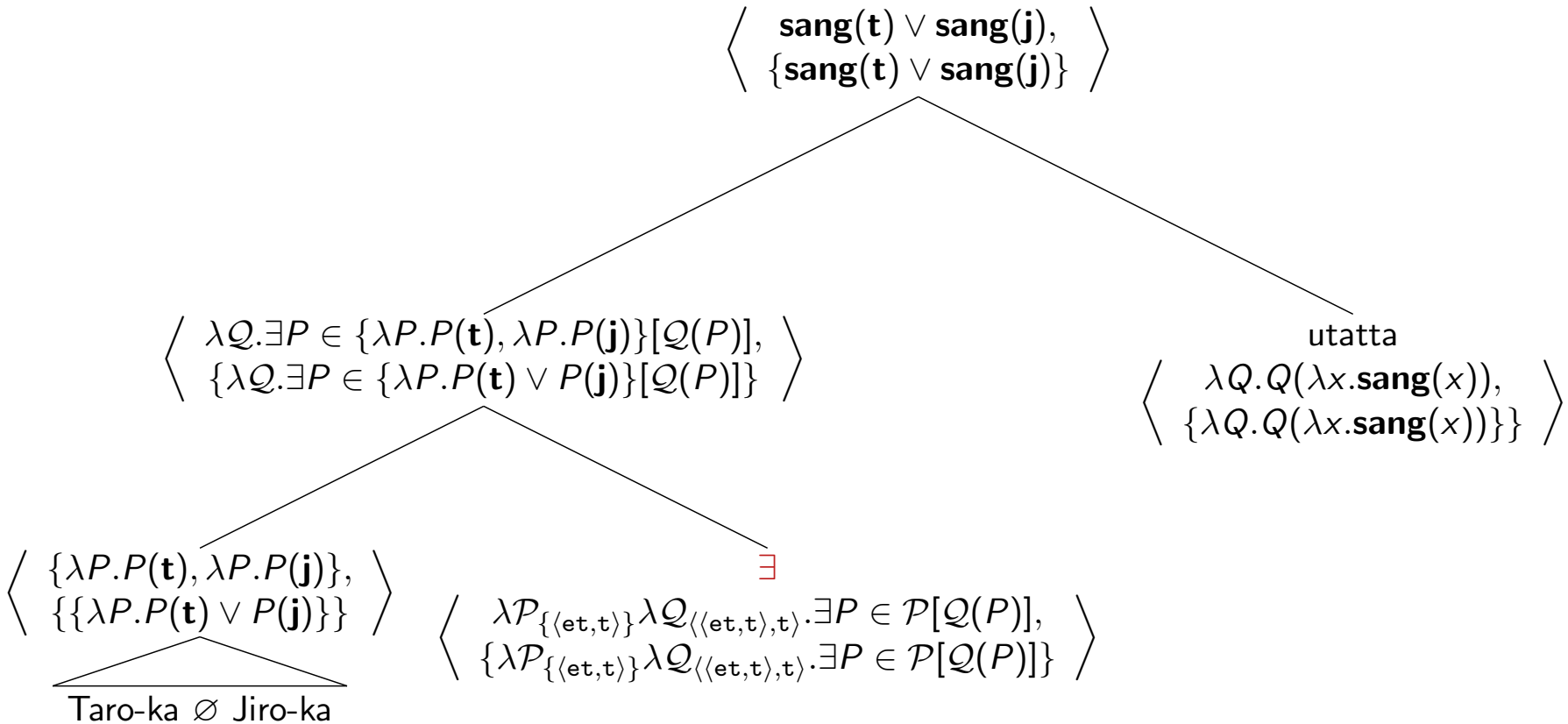
Accounting for the $\vee$-statement interpretation

(26)



Outline

A problem with proposition-taking predicates

- As it stands now, the current analysis predicts that CP-*wh*-*ka* and CP-*ka*-disjunctions are interpreted existentially when embedded under proposition-taking predicates like *believe*.
  - *believe* is proposition-taking.
  - CP-*wh*-*ka* and CP-*ka*-disjunctions denote sets of propositions.
  - Type-mismatch $\Rightarrow$ repair by $\exists$

(27) a. * Hanako-wa [dare-ga utatta-ka] shinjiteiru.
Hanako-TOP who-NOM sang-KA believe

b. * Hanako-wa [[Taro-ga utatta-ka] [Jiro-ga
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cam-KA believe

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A problem with proposition-taking predicates (cont.)

- The analysis up to this point predicts the following pair to have equivalent interpretations.

(28) ✓ Hanako-wa [dare-**ka**-ga utatta-to] shinjiteiru.
Hanako-TOP who-KA-NOM sang-that believe
'Hanako believes that someone sang.'

(29) * Hanako-wa [dare-ga utatta-**ka**] shinjiteiru.
Hanako-TOP who-NOM sang-KA believe

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Blocking-based account

Blocking

A form α BLOCKS form β with an equivalent interpretation if α is derived more economically than β. (Aronoff 1976; Horn 1984; Blutner 2000)

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Prediction of the blocking-based account

- **Prediction:** *ka* attaching to a CP *can* receive an existential interpretation if there is no competing form with an equivalent interpretation.
- This is precisely what happens in the following examples:

(30) [Dare-ga kita-kara-**ka**] Taro-wa yorokondeita.
who-NOM came-because-KA Taro-TOP was.happy
'For some person x, because x came, Taro was happy.'
('because'-clause)

(31) [Dare-ni au-tame-**ka**] Taro-wa hayaku
who-DAT meet-in.order.to-KA Taro-TOP early
daigaku-ni kita.
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- (32) and (33) have different interpretations:
  - (32) $\exists >$ 'because': 'Taro wanted a specific person to come.'
  - (33) 'because' $> \exists$: 'Taro wanted anyone to come.'
- Thus, (33) doesn't block (32).
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Outline

Back to the initial questions

Overarching research question

How can we account for the multi-functionality of *ka* with a unified semantics?

1. Explaining the two uses of *wh-ka* constructions

How can we account for the fact that *wh-ka* constructions give rise to *wh*-questions and indefinites, depending on the syntactic position of *ka*?

2. Explaining the functions of *ka* as a Q-particle and as a disj-marker

How can we extend the analysis of *ka* as a question particle (resulting from the investigation into the first question) to its use as a disjunction marker?

Answer to the first sub-question

1. Explaining the two uses of *wh-ka* constructions

How can we account for the fact that *wh-ka* constructions give rise to *wh*-questions and existential statement, depending on the syntactic position of *ka*?

- *ka* always projects a set of alternatives.
- If the *ka*-phrase is embedded under a **set-incompatible predicate**, the set has to undergo existential closure due to a type-mismatch. $\Rightarrow \exists$-statement
- If the *ka*-phrase is a **matrix CP** or **embedded under set-compatible predicate**, there is no existential closure. $\Rightarrow$ wh-Q

Answer to the second sub-question

2. Explaining the functions of *ka* as a Q-particle and as a disj-marker

How can we extend the analysis of *ka* as a question particle (resulting from the investigation into the first question) to its use as a disjunction marker?

- *ka*-disjunctions involve a union of the singleton sets projected by each *ka*-phrase.
- If the *ka*-disjunction is embedded under a **set-incompatible predicate**, the set has to undergo existential closure due to a type-mismatch. $\Rightarrow \vee$-statement
- If the *ka*-disjunction is a **matrix CP** or **embedded under set-compatible predicate**, there is no existential closure. $\Rightarrow$ alt-Q

Remaining puzzle: Ignorance implication

- But, there is another aspect of the meaning of *ka* which we have not discussed yet: the ignorance implication.
- Nishigauchi's (1990) observation: the following pair differ in the ignorance implication:

(35) a. Dare-**ka**-kara henna tegami-ga todoi-ta.
who-KA-from strange letter-NOM arrive-PAST
'A strange letter sang from somebody.'

b. Dare-kara-**ka** henna tegami-ga todoi-ta.
'A strange letter sang from god knows who.'

- (35a) can be felicitous in a situation where the speaker knows the description of the sender (e.g., 'that guy who always stands at that corner of Pleasant Street') whereas (35b) isn't.

Appendix: problem with extending Hagstrom to *ka*-disj.

- Although Hagstrom does not offer an analysis of *ka*-disjunctions, Slade (2011) extends the choice-function analysis to a similar disjunctive construction in Sinhala.
- Under such an analysis, *ka*s in a disjunction are attracted by $C_{[+int]}$ and undergoes an overt movement while they undergo a covert movement under $C_{[-int]}$.
- The analysis would incorrectly predict an AltQ interpretation for (37), which would be derived by the overt ATB movement of *ka* in (36).

(36) [Hanako-ka (soreka) Jiro-ka]-ga utatta.
Hanako-KA or Jiro-KA -NOM sang.
'Hanako or Jiro sang.'

(37) [Hanako *(soreka) Jiro]-ga utatta-**ka**.
Hanako or Jiro -NOM sang-KA
'Is it the case that either Hanako or Jiro sang?'

Appendix: problem with extending Shimoyama to *ka*-disj.

- Shimoyama (2006) does not discuss *ka*-disjunctions explicitly, but a natural way to extend her analysis to them would be to employ the alternative-semantic analysis of disjunctions (Kratzer & Shimoyama 2002, Beck and Kim 2006).
- This analysis would incorrectly predict an alt-Q interpretation for the following examples involving *ka*-disjunctions smaller than CPs:

(38) [Hanako-**ka** Jiro-**ka**]-ga utatta-**ka**.
Hanako-KA Jiro-KA -NOM sang-KA.
'whether or not Hanako or Jiro sang.' (✓pol-Q/*alt-Q)

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