

Higher Order Quantification outside Questions: The Case of Free Relatives

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1. The question
2. Free relatives: background
3. The puzzle
4. Proposal
5. Alternatives
6. Conclusions, questions ahead

The question

What kind of semantic objects do *wh*- phrases range over?

The question

There is evidence that *wh*-Ps can range over generalized quantifiers.

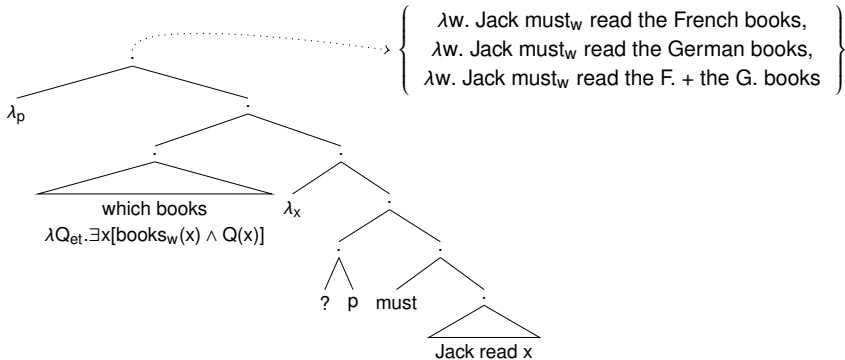
- Questions with modals (Spector, 2007, 2008)
- Questions with collective predicates (Xiang, 2021)
- Number inflected simplex *wh*-phrases (Elliott et al., 2022; Alonso-Ovalle and Rouillard, 2019, 2023)

A felicitous disjunctive answer

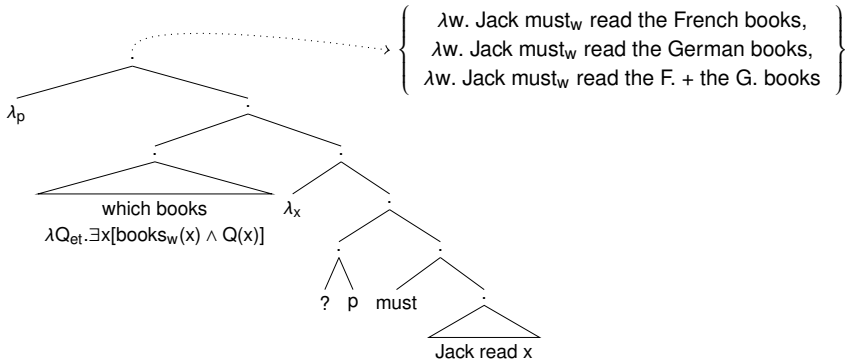
Scenario 0. Jack has to read some books. He has a choice, though.
At stake: which books he can choose from.

- (1) a. Which books must Jack read?
b. The French or the Russian novels. (Spector, 2007, 2008)

Undergeneration if *wh*-phrases range over entities

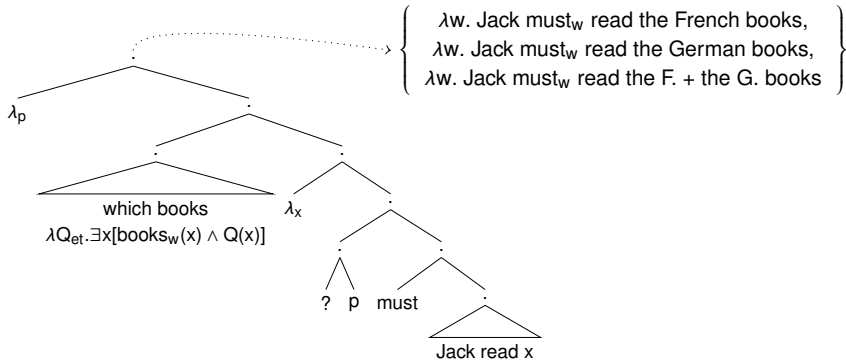


Undergeneration if *wh*-phrases range over entities



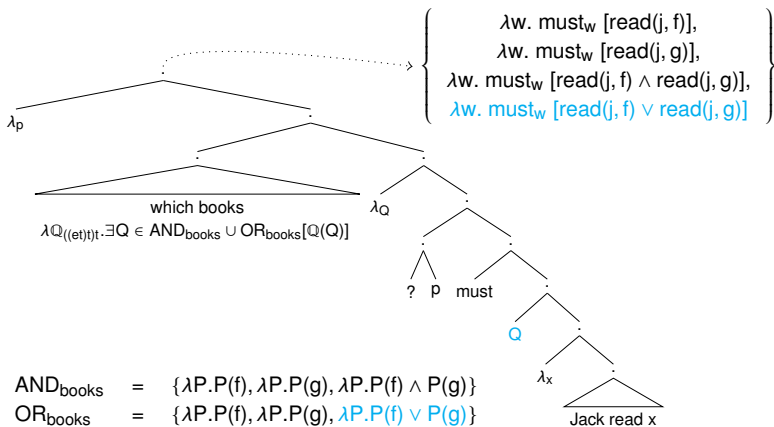
- Question wrongly predicted to take for granted that there are books that Jack *must* read.

Undergeneration if *wh*-phrases range over entities

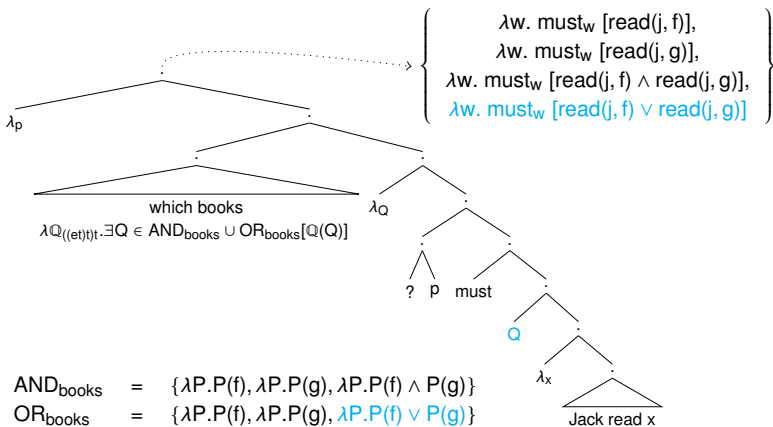


- Question wrongly predicted to take for granted that there are books that Jack *must* read.
- Semantics doesn't deliver the attested disjunctive answer.

Expected if *wh*- phrases range over generalized quantifiers

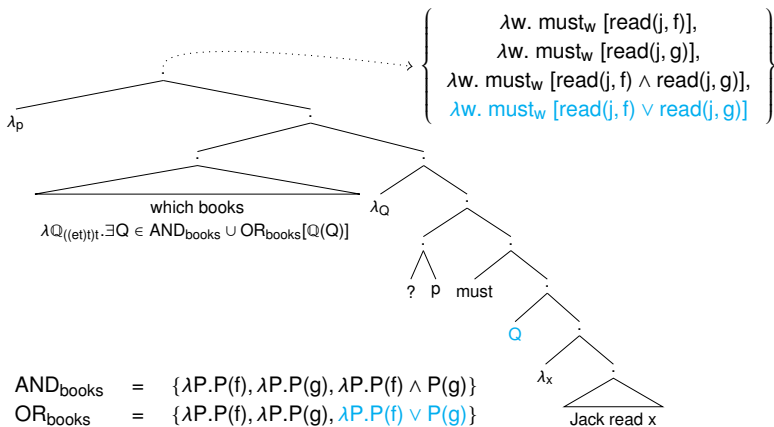


Expected if *wh*- phrases range over generalized quantifiers



- Question doesn't take for granted that there are books that Jack *must* read.

Expected if *wh*- phrases range over generalized quantifiers



- Question doesn't take for granted that there are books that Jack *must* read.
- Semantics delivers the attested disjunctive answer.

The question, today

Are there reasons to believe that *wh*-Ps range over generalized quantifiers beyond questions?

Wh- phrases beyond questions: Free Relatives

wh- clauses functioning as DPs, PPs / AdvPs, or AdjPs.

- (2) a. [_{DP} **What(ever)** Peter proposed] sounded right.
b. [_{DP} **Whichever plan** Peter proposed] sounded right.
- (3) I will go [_{PP} **where(ever)** they need me].
- (4) I will read the paper [_{AdvP} **how(ever)** it needs to be read].
- (5) Peter is [_{AdjP} **what(ever)** John takes French movies to be].

***Wh*- phrases beyond questions: Free Relatives**

In many languages, FRs are formed with *wh*- morphology.

In languages like English, plain *wh*- words in FRs are identical to interrogative words.

In other languages, like Slovenian, they are identical to relative pronouns in relative clauses headed by quantifiers/pronouns (*light-headed relative clauses (LHRs)*), often derived from interrogative words.

(Šimik, 2021)

The question, today

Are there reasons to believe that *wh*-Ps range over generalized quantifiers in free relatives?

The answer, today

Are there reasons to believe that *wh*-Ps range over generalized quantifiers in free relatives?

Yes!

The plan, today

1. Present a case, parallel to the question data presented in Spector 2008, that suggests that *wh*-Ps range over generalized quantifiers in free relatives.

The plan, today

1. Present a case, parallel to the question data presented in Spector 2008, that suggests that *wh*-Ps range over generalized quantifiers in free relatives.
2. Exclude alternative analyses.

The plan, today

We'll focus on Spanish, a language that

1. forms FRs with *wh*-phrases,
2. some of which (*quien(es)* 'who') arguably range over generalized quantifiers in questions.

(Alonso-Ovalle and Rouillard, 2019, 2023)

Roadmap

1. The question
2. Free relatives: background
3. The puzzle
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Background

Two parses { maximal
 { existential

Maximal FRs

- (6) Ana habló [FR con quien habló Bea]
Ana talked-to with whom talked-to Bea
'Ana talked to the people that Bea talked to.'

Maximal FRs

- (6) Ana habló [FR con quien habló Bea]
Ana talked-to with whom talked-to Bea
'Ana talked to the people that Bea talked to.'

- (7) LF: [FR the who λ_x Bea talked to x]

(cf. Jacobson 1995; Caponigro 2003)

Maximal FRs

(7) LF: [FR the who λ_x Bea talked to x]

[[who]]^w = λx . people_w(x) [[$\lambda_x \dots$]]^w = λx . talked-to_w(x)(b)

[[the]] = $\lambda X : \max_{\subseteq}(X) \neq \emptyset$. the $x \in \max_{\subseteq}(X)$

Maximal FRs: Illustration

(7) LF: $[\text{FR the who } \lambda_x \text{ Bea talked to } x]$

$[[\text{who } \dots]]^{w_0} = \{\text{carla, dalia, carla + dalia}\}$

$\max_{\subseteq}(\{\text{carla, dalia, carla + dalia}\}) = \{\text{carla + dalia}\}$

$[[7]]^{w_0} = [[\text{the}]]([\text{who } \dots]^{w_0}) = \text{carla + dalia.}$

Maximal FRs: Illustration

- (6) Ana habló [FR con quien habló Bea]
Ana talked-to with whom talked-to Bea
'Ana talked to the people that Bea talked to.'
- (8) LF: Ana talked-to [FR the who λ_x Bea talked to x]
[[[FR the who λ_x Bea talked to x]]]^{w0} = carla + dalia.

Assertion: Ana talked to Carla and Dalia.

Existential FRs

- (9) Ana tiene [FR con quien hablar]
Ana has with whom talk:INF
'There are people Ana can talk to.'

(Plann 1980, see references in Caponigro (forthcoming))

Existential FRs

Restricted, naturally found in existential constructions (not only with infinitival clauses), including existential HAVE constructions.

(Plann, 1980)

Existential FRs

(9) Ana tiene [FR con quien hablar]
Ana has with whom talk:INF

(10) LF: [FR \exists who λ_x PRO_i can talk to x]

(Caponigro, 2003)

Existential FRs

(10) LF: $[\text{FR } \exists \text{ who } \lambda_x \text{ PRO}_i \text{ can talk to } x]$

$[\text{who}]^w = \lambda x. \text{people}_w(x)$

$[\lambda_x \dots]^w = \lambda x. \text{Ana can}_w \text{ talk to } x$

$[\exists] = \lambda P. \lambda Q. [P(x) \wedge Q(x)]$

$[(10)]^w = \lambda Q. \exists x [\text{people}_w(x) \wedge \text{Ana can}_w \text{ talk to } x \wedge Q(x)]$

(see refs. in Caponigro (forthcoming))

Existential FRs

(9) Ana tiene [FR con quien hablar]
Ana has with whom talk:INF

(11) LF: [FR \exists who λ_x PRO_i can talk to x] λ_y Ana has y

Assertion: Ana has somebody that she can talk to.

Roadmap

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Preview

Spector's experiment can be extended: FRs containing a necessity modal allow for interpretations that cannot be captured with either maximal or existential parses.

Preview

The assumption that FRs can only have maximal or existential parses faces an [undergeneration challenge](#).

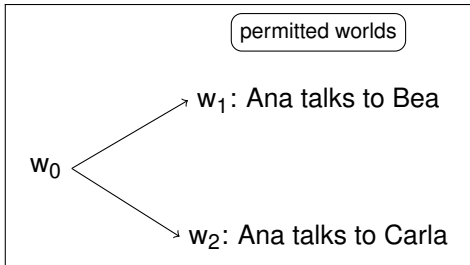
Preview

Next: the undergeneration challenge.

Then: quantification over disjunctions provides a solution.

The puzzle

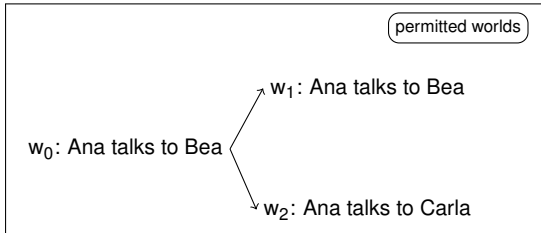
Scenario 1. To get a new printer for her office, Ana had to talk to one of her supervisors, Bea and Carla. Either one would suffice.



The puzzle

Scenario 1. ... In the end, Ana talked to Bea and got her new printer.

- (12) Ana habló [FR con quien tenía que hablar.]
Ana talked-to with whom had:3s COMP talk:INF
'Ana talked to whom she had to talk.'



Possible parses

- (13) [FR con quien tenía que hablar.]
with whom had:3s COMP talk:INF

Maximal: [FR the who λ_x pro_{Ana} had to talk to x]

Existential: [FR \exists who λ_x pro_{Ana} had to talk to x]

Not a maximal parse

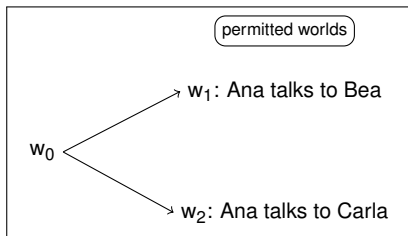
(14) LF: $[\text{FR the who } \lambda_x \text{ pro}_{\text{Ana}} \text{ had to talk to } x]$

$[[\text{(14)}]]^{w_0} = [\text{the}](\text{[who } \lambda_x \text{ pro}_{\text{Ana}} \text{ had to talk to } x])^{w_0}$

Not a maximal parse

$\llbracket \text{who } \lambda_x \text{ pro}_{\text{Ana}} \text{ had to talk to } x \rrbracket^{w_0} =$

$$\left\{ x : \text{people}_{w_0}(x) \wedge \forall w' \left[\begin{array}{l} \text{permitted}_{w_0}(w') \\ \rightarrow \\ \text{talk}_{w'}(a, x) \end{array} \right] \right\} = \emptyset$$



Not a maximal parse

(14) LF: $[\text{FR the who } \lambda_x \text{ pro}_{\text{Ana}} \text{ had to talk to } x]$

$$\begin{aligned} \llbracket (14) \rrbracket^{w_0} &= \llbracket \text{the} \rrbracket (\llbracket \text{who } \lambda_x \text{ pro}_{\text{Ana}} \text{ had to talk to } x \rrbracket^{w_0}) = \\ &\llbracket \text{the} \rrbracket (\emptyset) \end{aligned}$$

$$\llbracket \text{the} \rrbracket = \lambda X: \max_{\subseteq} (X) \neq \emptyset. \text{ the } x \in \max_{\subseteq} (X)$$

$$\max(\emptyset) = \emptyset$$

$\llbracket (14) \rrbracket^{w_0}$ is **undefined**.

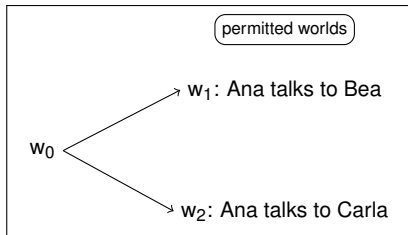
Not a maximal parse

(15) LF: Ana talked-to $[\text{FR the who } \lambda_x \text{ pro}_{\text{Ana}} \text{ had to talk to } x]$

$\llbracket [\text{FR the who } \lambda_x \text{ pro}_{\text{Ana}} \text{ had to talk to } x] \rrbracket^{w_0}$ is undefined.

$\llbracket (15) \rrbracket^{w_0}$ is **undefined**, too.

But (15) is judged to be felicitous and true in w_0



Not an existential parse

(12) Ana habló [FR con quien tenía que hablar.]
Ana talked-to with whom had:3s COMP talk:INF

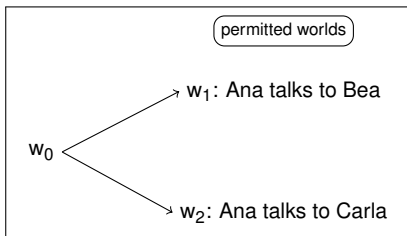
(16) [FR \exists who λ_x pro_{Ana} had to talk to x]

$$\llbracket(16)\rrbracket^{w_0} = \llbracket\exists\rrbracket(\llbracket\text{who } \lambda_x \text{ pro}_{\text{Ana}} \text{ had to talk to } x\rrbracket^{w_0})$$

Not an existential parse

$\llbracket \text{who } \lambda_x \text{ pro}_{\text{Ana}} \text{ had to talk to } x \rrbracket^{w_0} =$

$$\left\{ x : \forall w' \left[\begin{array}{c} \text{permitted}_{w_0}(w') \\ \rightarrow \\ \text{talk}_{w'}(a, x) \end{array} \right] \right\} = \emptyset$$



Not an existential parse

(16) $[\text{FR } \exists \text{ who } \lambda_x [\text{pro}_{\text{Ana}} \text{ had to talk to } x]]$

$$\llbracket (16) \rrbracket^{w_0} = \llbracket \exists \rrbracket (\llbracket \text{who } \lambda_x [\text{pro}_{\text{Ana}} \text{ had to talk to } x] \rrbracket^{w_0}) =$$

$$\llbracket \exists \rrbracket (\emptyset) = \lambda Q. \exists x [x \in \emptyset \wedge Q(x)]$$

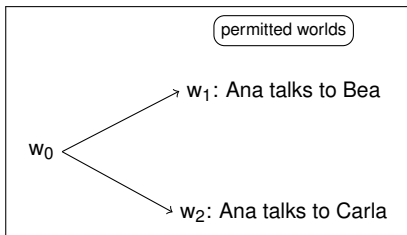
Not an existential parse

(12) Ana habló [FR con quien tenía que hablar.]
Ana talked-to with whom had:3s COMP talk:INF

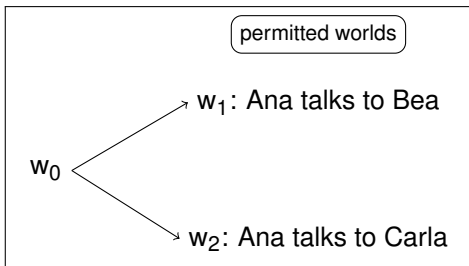
(17) LF: [FR \exists who λ_x [pro_{Ana} had to talk to x]] λ_y Ana talked-to y

$$\llbracket (17) \rrbracket^{w_0} = 1 \Leftrightarrow \exists x[x \in \emptyset \wedge \text{talked}_{w_0}(a, x)]$$

(17) predicted to be false, but judged to be felicitous and true in w_0



An undergeneration challenge



In Scenario 1, (12) is felicitous and true, but, under the assumption that the *wh*-phrase ranges over individuals, it is predicted to be either non-felicitous or false.

- (12) Ana habló [FR con quien tenía que hablar.]
Ana talked-to with whom had:3s COMP talk:INF

Roadmap

1. The question
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As in Qs, quantification over disjunctions saves the day

- (12) Ana habló [FR con quien tenía que hablar.]
Ana talked-to with whom had:3s COMP talk:INF
- (18) LF: [FR the who_{(et,t)t} λ_Q had Q_{et,t} λ_x pro_{Ana} talk to x]

As in Qs, quantification over disjunctions saves the day

(18) LF: $[\text{FR the who}_{(et,t)} \lambda_Q \text{ had } Q_{et,t} \lambda_x \text{ pro}_{\text{Ana}} \text{ talk to } x]$

$$\llbracket \text{who} \rrbracket^w = \{ \lambda P_{et}.P(b), \lambda P_{et}.P(c), \lambda P_{et}.P(b) \vee P(c) \}$$

$$\llbracket \text{who } \lambda_Q \dots \rrbracket^w = \{ \lambda P_{et}.P(b) \vee P(c) \}$$

$$\llbracket \text{the} \rrbracket = \lambda X: \max_{\subseteq}(X) \neq \emptyset. \text{ the } x \in \max_{\subseteq}(X)$$

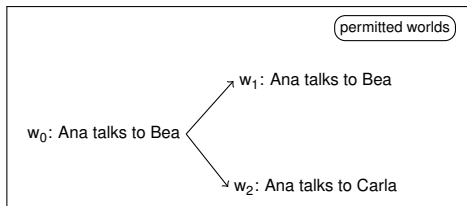
$$\llbracket (18) \rrbracket^w = \lambda P_{et}.P(b) \vee P(c)$$

As in Qs, quantification over disjunctions saves the day

(12) Ana habló [FR con quien tenía que hablar.]
Ana talked-to with whom had:3s COMP talk:INF

(19) [the who_(et,t) λ_Q [had [Q_{et,t} λ_x pro_{Ana} talk to t_x]]] λ_y Ana talked to y

$\llbracket (19) \rrbracket^{w_0}$ is true iff Ana talked_{w₀} to Bea \vee Ana talked_{w₀} to Carla.

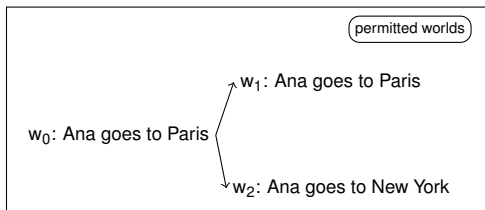


Target sentence rightly predicted to be felicitous and true in w_0

Beyond *wh*-Ps argued to have higher-order readings in Qs

(20) is felicitous and true in the scenario below.

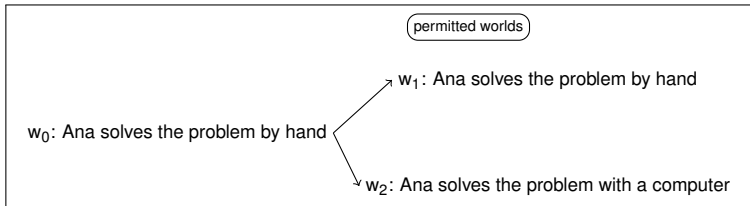
- (20) Ana fue a donde tenía que ir.
Ana went:3S to where had:3S COMP go:INF
'Ana went where she had to go.'



Beyond *wh*-Ps argued to have higher-order readings in Qs

(21) is felicitous and true in the scenario below.

- (21) Ana resolvió el problema como lo tenía que resolver.
Ana solved:SC the problema how it had:3S COMP solve:INF
'Ana solved the problem how he had to solve it.'



Interim summary

wh-Ps range over generalized quantifiers in FRs too.

Roadmap

1. The question
2. Free relatives: background
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Alternatives

1. Amount interpretations.
 - undergeneration challenge
 - overgeneration challenge
2. Kind interpretations.
 - undergeneration challenge
 - overgeneration challenges

Amount relatives?

Spanish headed relatives allow for amount interpretations: (22) is felicitous and true in (23).

(Mendia, 2017)

- (22) Ana habló con las personas con las que tenía que hablar.
Ana talked with the person:PL with the COMP had COMP hablar.
talk:INF.

‘Ana talked to the number of people she had to talk to.’

- (23) *Scenario 4.* Ana has to talk to seven people. She can choose who she talks to. She talked to seven people.

Amount relatives?

'Light headed' relatives allow for amount interpretations too.

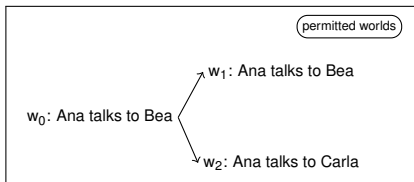
(Mendia, 2017)

- (24) Ana habló con las que tenía que hablar.
Ana talked with the COMP had COMP talk:INF
'Ana talked to the number of people she had to talk to.'

Amount relatives?

An amount interpretation of the FR in (12) would predict (12) to be felicitous and true in Scenario 1.

- (12) Ana habló con quien tenía que hablar.
Ana talked with who had COMP talk:INF
'Ana talked to the **number** of people she had to talk to.'

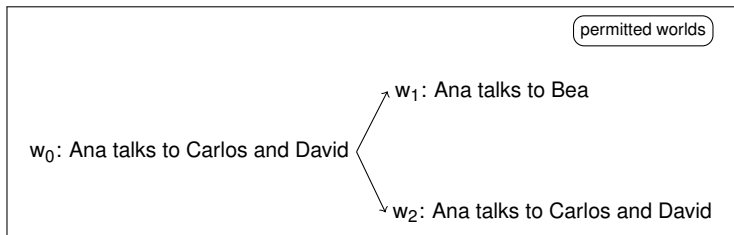


Ana had to talk to one person. She talked to one person.

Not an amount interpretation

- (12) Ana habló con quien tenía que hablar.
Ana talked with who had COMP talk:INF

(12) is also felicitous and true in Scenario 2:



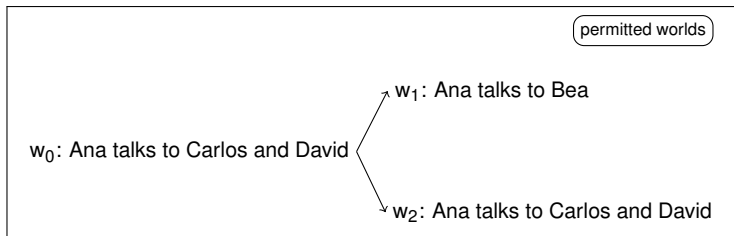
Not an amount interpretation

- (12) Ana habló con quien tenía que hablar.
Ana talked with who had COMP talk:INF

Predicted: 'Ana talked to n people, where n = the number of people she had to talk to.'

- (25) $\{n : \forall w' [\text{permitted}_{w_0}(w') \rightarrow |\{x : \text{talk}_{w'}(a, x)\}| = n]\} = \emptyset$

Undergeneration: predicted presupposition failure.



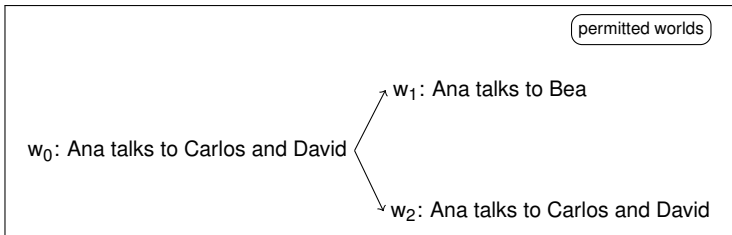
Not an amount interpretation

- (12) Ana habló con quien tenía que hablar.
Ana talked with who had COMP talk:INF

Predicted: 'Ana talked to n people, where n = the number of people she had to talk to.'

- (26) $\{n : \forall w'[\text{permitted}_{w_0}(w') \rightarrow |\{x : \text{talk}_{w'}(a, x)\}| \geq n]\} = 1$

Undergeneration: (12) predicted to be false.



Not an amount interpretation

Overgeneration: *quien* FRs don't generally allow for amount interpretations.

- (27) How many people did he get in his car?
- (28) Metió en su coche a los que cabían.
put:3S in his car OBJ the.PL that fit:3PL
'He got in his car as many people as they fit.'
- (29) ?Metió en su coche a quien cabía.
put:3S in his car obj who.SG fit:3PL
'He got in his car that person or those people who fit.'
- (30) ?Metió en su coche a quienes cabían.
put:3S in his car obj who.PL fit:3PL
'He got in his car those people who fit.'

1. Amount interpretations.
 - undergeneration challenge
 - overgeneration challenge
2. Kind interpretations.
 - undergeneration challenge
 - overgeneration challenges

(Sub-)kind interpretations?

Mendia (2017): amount relatives denote (sub)kinds.

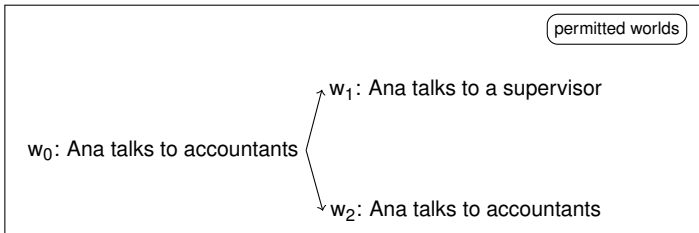
(Sub-)kind interpretations?

- (12) Ana habló con quien tenía que hablar.
Ana talked with who had COMP talk:INF
'Ana talked to the kind of people that she had to talk to.'

Sub-kind interpretations?

- (12) Ana habló con quien tenía que hablar.
Ana talked with who had COMP talk:INF

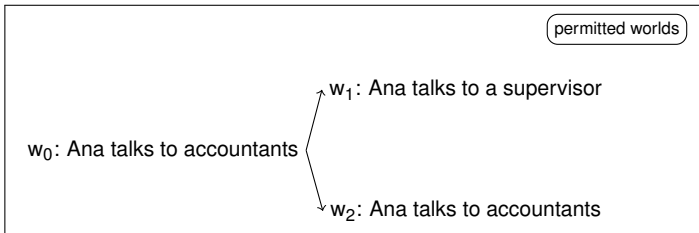
(12) is felicitous and true in Scenario 3:



(Sub-)kind interpretations?

- (12) Ana habló con quien tenía que hablar.
Ana talked with who had COMP talk:INF
'Ana talked to **the kind of people** that she had to talk to.'
- (31) $\{k : \forall w' [\text{permitted}_{w_0}(w') \rightarrow \exists x [\text{talk}_{w'}(a, x)] \wedge x \text{ instantiates } k]\}$
 $= \emptyset?$

Undergeneration: (12) predicted to be a presupposition failure.



Subkind interpretations?

Overgeneration: Caponigro (forthcoming): Italian *chi* FRs don't generally allow for kind interpretations. Same for Spanish:

(32) ??Quien habla diez lenguas es raro.
who speaks ten languages is rare

(Intended, not possible): 'The kind of person who speaks ten languages is a rare kind.'

(33) ??Quien tiene el pelo moreno es común en el sur de
who has the hair dark is common in the south of
España.
Spain

(Intended, not possible): 'The kind of people who has dark hair is a common kind in Southern Spain.'

Unlike amount relatives

Heads of amount relatives can be related to the 'logical subject' of the existential construction.

(Carlson, 1977)

(34) There wasn't [the water in the sink that there was ___ in the bathtub].

(attributed to Lisa Selkirk)

Unlike amount relatives

In 'light headed' relatives, their 'heads' can also be related to the logical subject of the existential construction.

- (35) No había en el salón los que había — en la
not was in the living room the:PL COMP were — in the
oficina.
office

Unlike amount relatives

Overgeneration: *quien* FRs sharply contrast with amount relatives.

- (36) No había en el salón *quien(es) había — en la
not was in the living room who(:PL) were — in the
oficina.
office

Roadmap

1. The question
2. Free relatives: background
3. The puzzle
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Summary

In parallel to Spector's question data, FRs with universal modals provide reasons to believe that *wh*-Ps range over generalized quantifiers, in particular disjunctions.

Questions ahead

If this conclusion is on the right track, many questions lie ahead of us.

Questions ahead 1

Do free relatives range over entities as well as over generalized quantifiers?

Questions ahead 2

What generalized quantifiers do *wh*-Ps in FRs range over?

Questions ahead 2

Why are existential readings restricted?

Parallel to questions

The literature on questions faces the same issues.

Parallel to questions

There are parallels between FRs and questions.

Parallel to questions

As observed by Spector in questions, the high order reading of FRs is restricted: disjunctions can't scope within weak islands like negation or factive predicates.

Parallel to questions

(37) Which books didn't Jack read?

Unavailable: 'Jack read neither the French novels nor the Russian novels.'

(Spector)

(38) Ana habló [FR con quien no tenía que hablar.]

Ana talked with who NEG had COMP talk:INF

Unavailable where Ana was not required to talk to C or D:

'Ana didn't talk to C or D.'

Parallel to questions

- (39) Which books does Sue know that Jack read?
Unavailable in case Sue knows that Jack read one of the two but doesn't know which: 'Sue knows that Jack either read the French novels or the Russian novels.' (Spector)
- (40) Ana habló [FR con quien Bea sabe que habló]
Ana talked with who Bea knows COMP talked:3s
?? if Bea knows that Ana talked to either C or D and Ana talked, e.g., to C.

Parallel to questions

Chierchia and Caponigro (2013): existential readings of FRs partly related to 'mention-some' interpretations of questions.

Next steps

Exploring the connection between FRs and questions, possibly along the lines of Chierchia and Caponigro (2013), may provide answers to some of the questions ahead.

Thanks!

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