Two types of subordination in multiple-*wh* questions

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Quantificational subordination

- Every boy bought a gift. Each of them sent it to Ada.

Boy	Gift
Max	
Kyle	
Sam	

each of them

Boy	Gift
Max	

it = 

Boy	Gift
Kyle	

it = 

Boy	Gift
Sam	

it = 

Krifka (1996); Brasoveanu (2010); a.o.

Question subordination

- Which boy bought which gift **and** who did each of them send it to?

Answer: Max bought a hat; Kyle a camera; and Sam a book.

Each boy sent his gift to Ada.

Boy	Gift
Max	
Kyle	
Sam	

each of them

Boy	Gift
Max	

it = 

Boy	Gift
Kyle	

it = 

Boy	Gift
Sam	

it = 

Dotlačil & Roelofsen (2019)

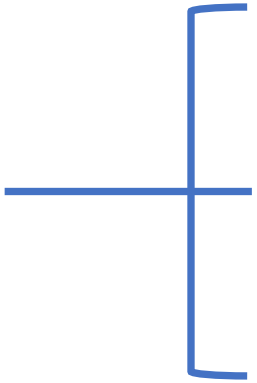
Question Subordination

- Which boy bought which gift **and** who did he send it to?

Answer: Max bought the hat; Kyle the camera; and Sam the book.

Each boy sent his gift to Ada.

Boy	Gift
Max	
Kyle	
Sam	



Boy	Gift
Max	

he = Max; it = 

Boy	Gift
Kyle	

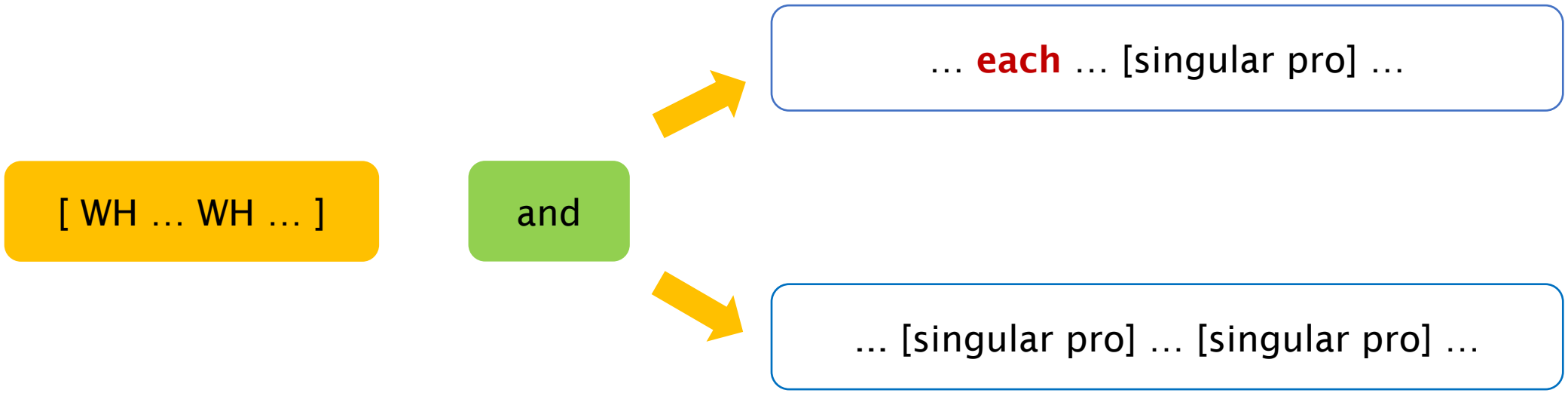
he = Kyle; it = 

Boy	Gift
Sam	

he = Sam; it = 

van Rooy (1998)

Two types of question subordination



Coordinator and distributive item

- Which boy bought which gift? Who did he send it to?

  Answer: \# Max bought a hat; Kyle a camera; and Sam a book.
  Each of them sent his gift to Ada.

- Which boy bought which gift? Who did each of them send it to?

  Answer: Max bought a hat; Kyle a camera; and Sam a book.
  Each of them sent his gift to Ada.

Simon Charlow (p.c.)

Coordinator and distributive item

- Which boy bought which gift? I heard he sent it to Ada.

  Answer: \# Max bought a hat; Kyle a camera; and Sam a book.

  Right. Each of them sent his gift to Ada.

- Which boy bought which gift? I heard each of them send it to Ada.

  Answer: Max bought a hat; Kyle a camera; and Sam a book.

  Right. Each of them sent his gift to Ada.

Generalization

[WH … WH …]

and

… **each** … [singular pro] …

… [singular pro] … [singular pro] …

[WH … WH …]

… **each** … [singular pro] …

Analysis

A dynamic family-of-questions approach

{ Max bought that hat; Kyle that camera; Sam that book,
Max bought that camera, Kyle that book; Sam that hat,
… } and who did each of them send it to

PL { which gift did Max buy
which gift did Kyle buy
which gift did Sam buy } and who did he send it to

which boy

bought which gift

Hagstrom (1998); Fox (2012); Nicolae (2013); Kotek (2014); a.o.

Hamblin semantics + Dynamic Plural Logic

$$[\text{which}^u \text{ boy}]_d = \left\{ \begin{array}{l} [\text{Max}^u]_d, \\ [\text{Kyle}^u]_d, \\ [\text{Sam}^u]_d \end{array} \right\}$$

G
g

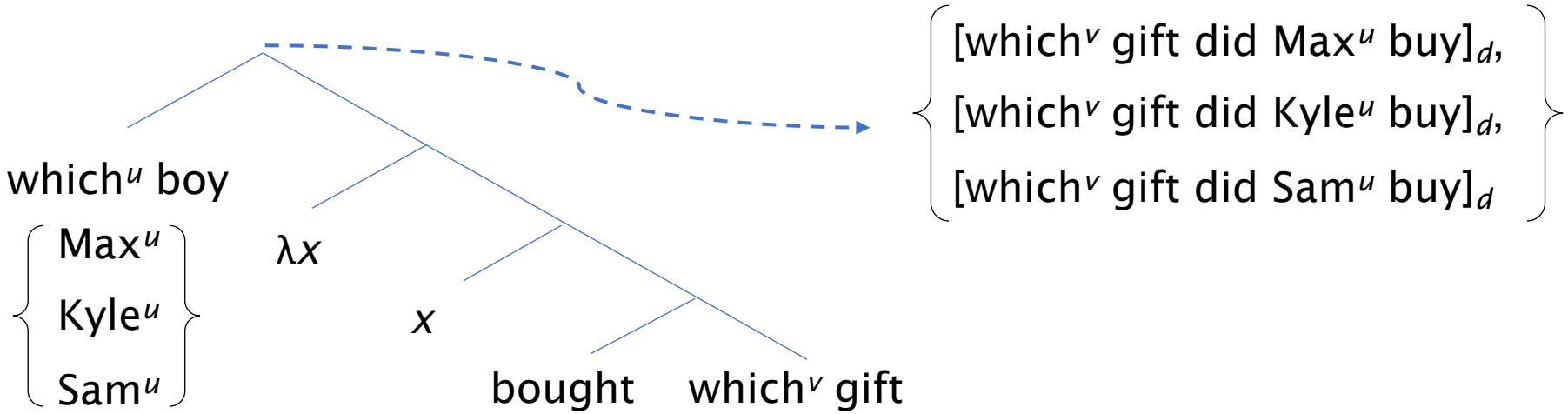
$$[\text{which}^u \text{ boy was late}]_d = \left\{ \begin{array}{l} [\text{Max}^u \text{ was late}]_d, \\ [\text{Kyle}^u \text{ was late}]_d, \\ [\text{Sam}^u \text{ was late}]_d \end{array} \right\}$$

G	u
g	Max

G	u
g	Kyle

G	u
g	Sam

Family of questions



Dependency in family of questions

For each boy, he is associated with the short answer to one question, i.e., the gift he bought

Possible pair-list answers

[which^u boy bought which^v gift]$_d$

{[which^v gift did Max^u buy]$_d$,
[which^v gift did Kyle^u buy]$_d$,
[which^v gift did Sam^u buy]$_d$

A possible pair-list answer:

[Max^u bought C^v]$_d$ ⩊ [Kyle^u bought B^v]$_d$ ⩊
[Sam^u bought H^v]$_d$

G	u	v
g_1	Max	📷
g_2	Kyle	📚
g_3	Sam	🎩

{[Max^u bought C^v]$_d$
[Max^u bought B^v]$_d$
[Max^u bought H^v]$_d$

G	u	v
g	Max	📷

U

{[Kyle^u bought C^v]$_d$
[Kyle^u bought B^v]$_d$
[Kyle^u bought H^v]$_d$

G	u	v
g	Kyle	📚

U

{[Sam^u bought C^v]$_d$
[Sam^u bought B^v]$_d$
[Sam^u bought H^v]$_d$

G	u	v
g	Sam	🎩

Possible pair-list answers (cont'd)

{ [which^{v} gift did Max^{u} buy]$_{d}$,
[which^{v} gift did Kyle^{u} buy]$_{d}$,
[which^{v} gift did Sam^{u} buy]$_{d}$ }

[PL]$_{d}$

[which^{u} boy bought which^{v} gift]$_{d}$

{ [Max^{u} bought C^{v}]$_{d}$ ⫿ [Kyle^{u} bought B^{v}]$_{d}$ ⫿ [Sam^{u} bought H^{v}]$_{d}$,
[Max^{u} bought B^{v}]$_{d}$ ⫿ [Kyle^{u} bought H^{v}]$_{d}$ ⫿ [Sam^{u} bought C^{v}]$_{d}$,
[Max^{u} bought C^{v}]$_{d}$ ⫿ [Kyle^{u} bought H^{v}]$_{d}$ ⫿ [Sam^{u} bought B^{v}]$_{d}$, … }

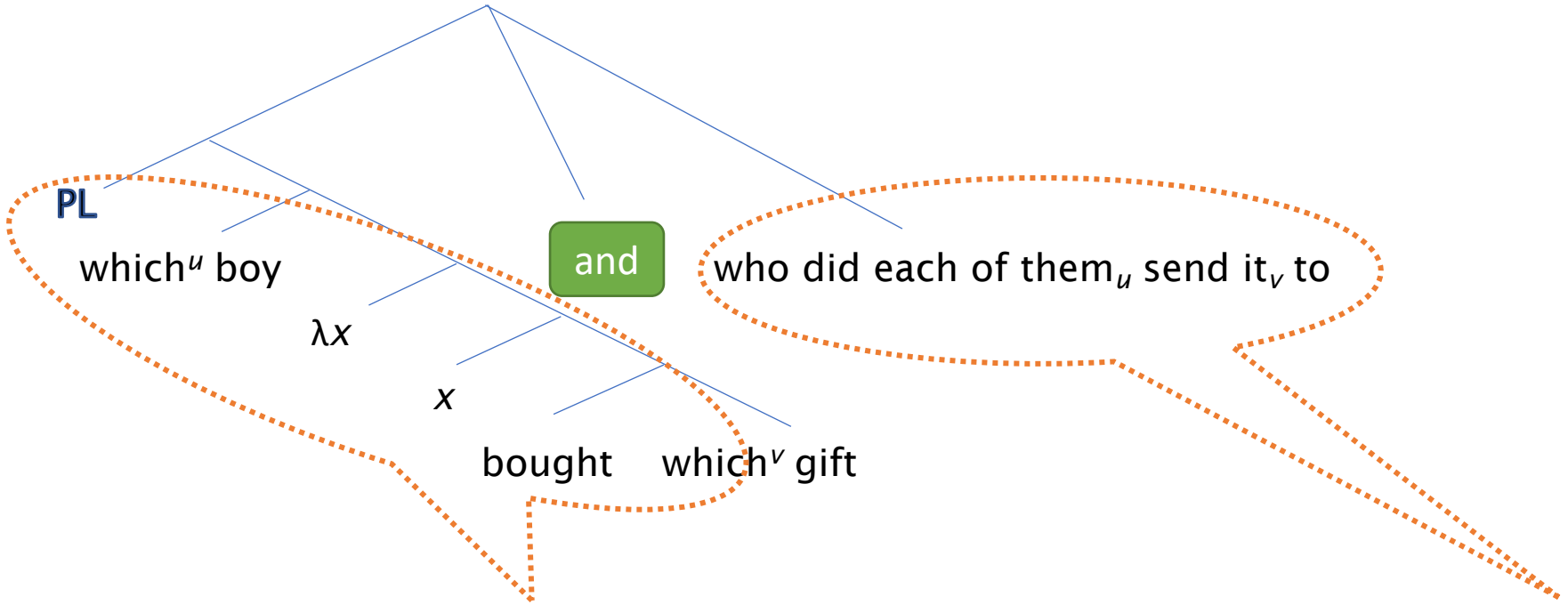
G	*u*	*v*
g_1	Max	
g_2	Kyle	
g_3	Sam	

G	*u*	*v*
g_1	Max	
g_2	Kyle	
g_3	Sam	

Dependency in each possible pair-list answer

For each boy, he is associated with a (different) gift

Accessing pair-list answers



{ [Max^{u} bought C^{v}]$_{d}$ ⫿ [Kyle^{u} bought B^{v}]$_{d}$ ⫿ [Sam^{u} bought H^{v}]$_{d}$, … } [and]$_{d}$ { [each of them$_{u}$ send it$_{v}$ to Ada]$_{d}$, [each of them$_{u}$ send it$_{v}$ to Lisa]$_{d}$ }

Accessing pair-list answers (cont'd)

[Max^u bought C^v]$_d$ ⫿ [Kyle^u bought B^v]$_d$ ⫿ [Sam^u bought H^v]$_d$ [and]$_d$ [each of them$_u$ sent it$_v$ to Ada]$_d$,

[Max^u bought C^v]$_d$ ⫿ [Kyle^u bought B^v]$_d$ ⫿ [Sam^u bought H^v]$_d$ [and]$_d$ [each of them$_u$ sent it$_v$ to Lisa]$_d$,

[Max^u bought B^v]$_d$ ⫿ [Kyle^u bought H^v]$_d$ ⫿ [Sam^u bought C^v]$_d$. [and]$_d$ [each of them$_u$ sent it$_v$ to Ada]$_d$,

[Max^u bought B^v]$_d$ ⫿ [Kyle^u bought H^v]$_d$ ⫿ [Sam^u bought C^v]$_d$. [and]$_d$ [each of them$_u$ sent it$_v$ to Lisa]$_d$, …

[Max^u bought C^v]$_d$ ⫿ [Kyle^u bought B^v]$_d$ ⫿ [Sam^u bought H^v]$_d$

G	*u*	*v*
g_1	Max	
g_2	Kyle	
g_3	Sam	

and each of them

G	*u*	*v*
g_1	Max	

sent it = 

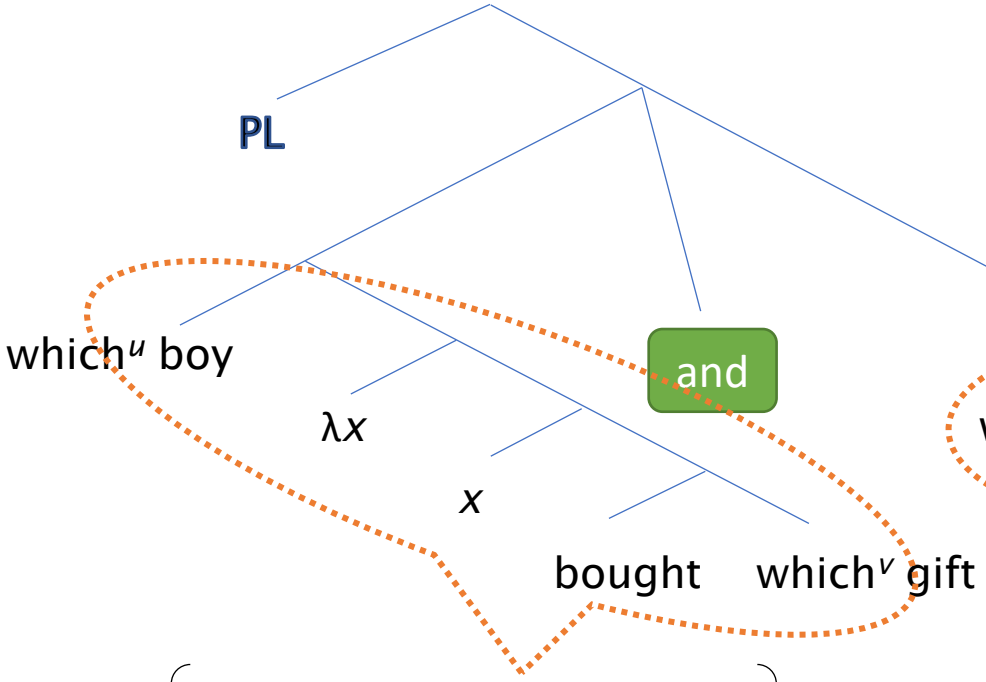
G	*u*	*v*
g_2	Kyle	

sent it = 

G	Boy	Gift
g_3	Sam	

sent it = 

Accessing a family of questions

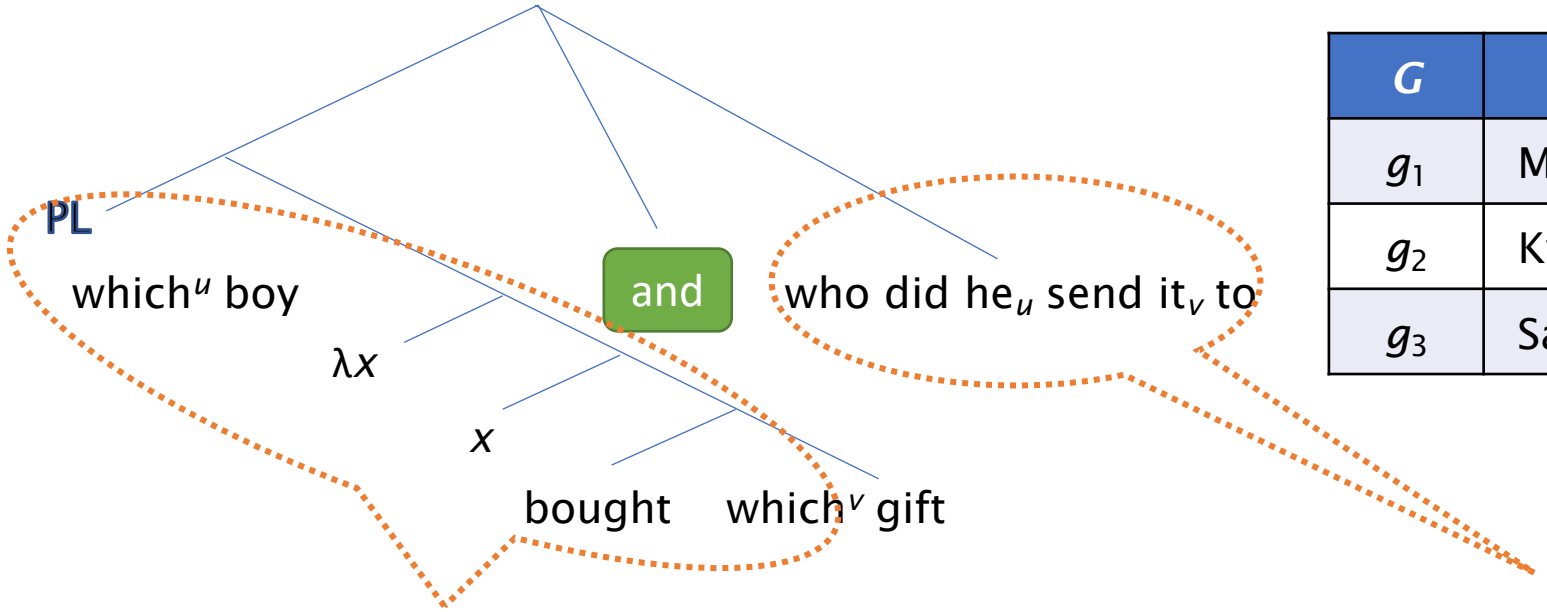


who did he$_{u}$ send it$_{v}$ to

{ [which^{v} gift did Max^{u} buy and who did he$_{u}$ send it$_{v}$ to]$_{d}$,
[which^{v} gift did Kyle^{u} buy and who did he$_{u}$ send it$_{v}$ to]$_{d}$,
[which^{v} gift did Sam^{u} buy and who did he$_{u}$ send it$_{v}$ to]$_{d}$ }

{ [which^{v} gift did Max^{u} buy]$_{d}$,
[which^{v} gift did Kyle^{u} buy]$_{d}$,
[which^{v} gift did Sam^{u} buy]$_{d}$ } → [and]$_{d}$ → [who did he$_{u}$ send it$_{v}$ to]$_{d}$

#Pair-list answers + singular pronouns



G	*u*	*v*
g_1	Max	
g_2	Kyle	
g_3	Sam	

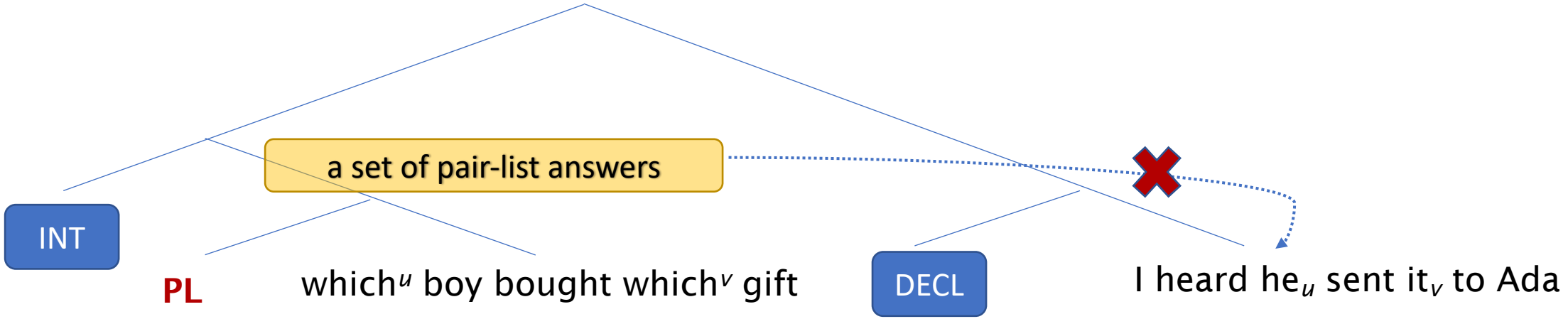
he$_u$ =/= {Max, Kyle, Sam}

it$_v$ =/= {  **,**  **,**  **}**

{ [Max^u bought C^v]$_d$ ⊍ [Kyle^u bought B^v]$_d$ ⊍ [Sam^u bought H^v]$_d$, [and]$_d$ [he$_u$ send it$_v$ to Ada]$_d$,

[Max^u bought B^v]$_d$ ⊍ [Kyle^u bought H^v]$_d$ ⊍ [Sam^u bought C^v]$_d$, ... [he$_u$ send it$_v$ to Lisa]$_d$ }

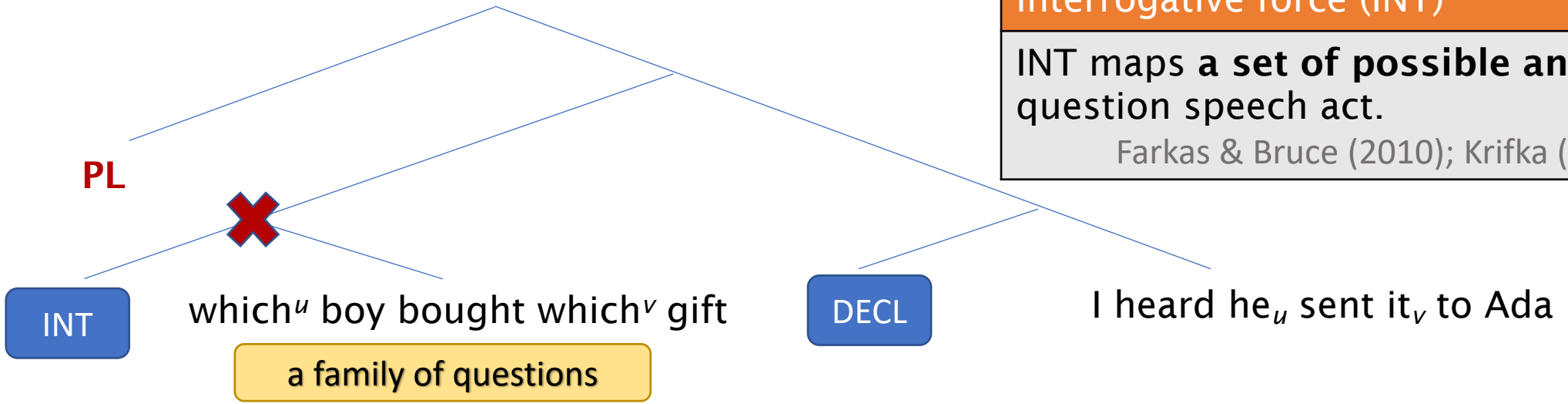
Coordination of speech acts



Interrogative force (INT)

INT maps **a set of possible answers** to question speech act.

Farkas & Bruce (2010); Krifka (2013); a.o.



Conclusion

Max bought that hat; Kyle that camera; Sam that book,
Max bought that camera, Kyle that book; Sam that hat,
…

and

who did each of them send it to

PL

which gift did Max buy
which gift did Kyle buy
which gift did Sam buy

and

who did he send it to

which boy

bought

which gift

Two types, two strategies

- Two types of question subordination
- Accessing two kinds of dependency