The syntax and semantics of headless relatives

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https://chaoyichen71.github.io/defense-slides.pdf

Headless relative clauses

Headless relatives: Those relatives that lack overt external heads.

(1) I ate [what John cooked ___ yesterday].

Properties characterizing headless relatives (Caponigro 2021)

- They are embedded/dependent/subordinated clauses.
- They lack a constituent.
- They lack an "external head".
- They exhibit the same distribution and interpretation as DPs, PPs, AdjP or AdvPs.

(2) He will be [however hardworking you expect him to be].

(3) I will play my music [however loudly you play yours].

Types	D	wh	REL/COMP
Free relative clauses	−	+	±
Light-headed relative clauses	+	±	±
Super-free relative clauses	−	−	±

(4) **Light-headed relatives: determiner + WH-WORD**

Jan czyta [to, co   Maria czyta].   [Polish]
Jan reads this what Maria reads

'Jan reads what Maria reads.'

Types	D	wh	REL/COMP
Free relative clauses	−	+	±
Light-headed relative clauses	+	±	±
Super-free relative clauses	−	−	±

- **Super-free relatives: non-wh-relativizer**

  Bhí [a raibh __ san Oileán] ag féachaint ar na naomhóga.　　[Irish]
  was REL was　　in.the Island look.PROG　on the currachs
  'Everyone who was in the Island was watching the currachs.'

- **Super-free relatives: no-marker**

  [máki-and'əh　nǐh=yɨʔ=ʔǐh ni-ĕ-ew-ĭt]=yɨʔ-íʔ?　　　　　　　　[Hup]
  Mark-ASSOC.PL POSS=FOC=M be-PVF-FLR-OBL=FOC-INT
  'It was with [that one who used to be associated with Mark's group] (that you went)?'

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This dissertation

Syn The categorical transformations of nominal headless relatives
($CP \rightarrow NP/DP$; cross-linguistic)

Syn Whether all arguments can be equally relativized (Mandarin SFR)

Sem The semantic composition of headless relatives (English FR)

Sem The semantics of headless relatives and modified bare nouns (English FR)

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The categorical transformations of nominal headless relatives

English headed relatives are introduced by either wh-words or null operators.

(4)   I ate the food [which$_i$ you cooked t_i yesterday].

(5)   I ate the food [op$_i$ you cooked t_i yesterday].

> **Question**
>
> a. Is the op-strategy/non-wh-strategy available for headless relatives?
> b. If so, what can they tell us about the categorical transformations?

- **Such headless relatives exist:** Tsez and Mandarin headless relatives
- **A theoretical issue:** category transformations in headless relatives
- **(Re)labeling analysis:** different paths to one destination

Tsez headless relatives

Tsez headless relatives

Tsez (Northeast Caucasian) headless relatives: overt wh-word stays in-situ (Polinsky 2015).

(6) [ħuł   babi-y-ä   šebi   žek'-ä(-si)]
     yesterday father-os-ERG who/what.ABS hit.PST.WIT.INTERR.ATTR
     ø-ik'i-s.
     I-go-PST.WIT
     'Whoever father beat yesterday left.'   (Polinsky 2015: 291)

Characterising Tsez headless relatives

a. the affix si/zo as nominalizers
b. relativized elements undergo A′-movements

A closer look at Tsez headless relatives: si/zo

Tsez's headless relatives have a suffix *si/zo* that appears on the verbs.

si: the derived elements are in absolute cases

(7) [ħuɬ   babi-y-ä   šebi   žek'-ä(-si)]
     yesterday father-os-ERG who/what.ABS hit.PST.WIT.INTERR.ATTR
     ø-ik'i-s.
     I-go-PST.WIT
     'Whoever Father beat yesterday left.'

zo: the derived elements are in any other cases.

(8) [ħuɬ   babi-y-ä   šebi
     yesterday father-os-ERG who/what.ABS
     žek'-ä-*(zo-)r]   magalu   teλ!
     hit.PST.WIT.INTERR-ATTR.OBL-LAT bread.ABS.III give.IMP
     'Give the bread to whoever Father beat yesterday!'

> **Question**
>
> What is the nature of *si/zo*?

The marker *si/zo* widely appears in two kinds of nominalizations: event and entity nominalizations.

Event nominalizations: The participles ending in *zo* can be used as noun phrases denoting events.

(9) cax-xo-zo aki-k'-si di.
write-PRS-ATTR.OS.ERG tired-TR-PST.WIT 1SG.ABS
'Writing tired me out.' (Polinsky 2015: 53)

Entity nominalizations: the marker si/zo derives nouns of objects or persons. si/zo can combine with nouns or noun phrases to derive another semantically-related noun, and nominalize adverbs and verbs (Polinsky 2015).

(10) meši-za-xo-**zo**-r
      calf-PL.OS-PRS-ATTR.OS-LAT
      'to the calf shepherd' (lit.: to the (one) at calves)   (Polinsky 2015: 54)

(11) waħħo-**si**-ni-de
      down-ATTR-DEF-APUD.ESS
      'next to the one down below'   (Polinsky 2015: 55)

(12) ø-oħħo-xo-**zo**   eλi-n…
      I-be.in.the.middle-PRS-ATTR.OS.ERG say-PST.NWIT
      'the middle one said…'   (Polinsky 2015: 55)

Characterizing Tsez headless relatives

a. the affix -si/-zo as nominalizers
b. relativized elements undergo A′-movements

Wh-in-situ in Tsez is derived from movements in parallel with overt English wh-movements (Polinsky & Potsdam 2001, Polinsky 2015; Demirok 2017).

Evidence-1: Weak Crossover (WCO)

(13)   * Who$_1$ did his$_1$ mother invite t$_1$?

(14)   * nesiz-(tow) babiy-ā šebi žek'-ā?
       his-own father-ERG who.ABS hit-PST.INTERR
       Intended: Who$_1$ did his$_1$ father hit?

Evidence-2: wh/quantifier scope interactions

(15) What did every guest bring?

    1.   Every guest brought chocolate.   [what > ∀ guest]

    2.   John brought dip, Kyle brought salad ....   [∀ guest > what]

(16) šibaw ɣˤʷway-ā šebi han-ā
    every dog-ᴇʀɢ what bite-ᴘsᴛ.ɪɴᴛᴇʀʀ
    What did every dog bite?

A closer look at Tsez headless relatives

Evidence-3: in-situ island effects

(17) * [bełi-ƛ'   šebi   b-äk'-äsi yäł-zay]
     chase-SUPER.ESS who.ABS.IPL IPL-GO-RES be.PRS-while
     ƛirba-bi   b-ay-ä?
     guests-PL.ABS.IPL IPL-came-PST.WIT.INTERR
     Intended: 'The guests arrived when who were away hunting?'

(18) * už-ā   [t'ek-no   šeb(i-n)]   r-is-ā
     boy-ERG book.ABS-and what.ABS-and II-IV.PL-buy-PST.INTERR
     Intended: 'The boy bought a book and what?'

Characterizing Tsez headless relatives:

a. the affix si/zo as nominalizers
b. relativized elements undergo A′-movements

Question

Can we see similar patterns in other non-wh headless relatives?Yes!

Mandarin headless relatives

Mandarin headless relatives

Mandarin headless relatives obligatorily end with a sentence-final marker *de* and relativized elements are silent (Li and Thompson 1981; Zhu 1982; among others).

(19) [ta shuo *(de)] shi yingyu
        he speak DE   be English
        'What he speaks is English.'

Mandarin headless relatives

They are attested in many constructions and syntactic positions.

First, they can freely appear in negation sentences and *zhi* 'only'-sentences.

(20) wo ting bu-dong   [ta shuo de]
     I   listen not-understand he say   DE
     'I cannot understand what he said.'

(21) zheli mei-you [wo xihuan de]
     here not-have I   like   DE
     'There is nothing I like here.'

(22) wo zhi kan [Zhangsan yan de]
     I   only watch Zhangsan act DE
     'I only watch what Zhangsan acts on.'

(23) wo zhi zuo [laoshi   yaoqiu de]
     I   only do professor require DE
     'I only do what the professor requires.'

Mandarin headless relatives

Besides, they are also grammatical in any nominal positions.

(24) [Zhangsan (zuotian) zhu de] dou hen haochi
Zhangsan yesterday cook DE all very tasty
'What ZS cooked (yesterday) was all tasty.'

(25) [(zuotian) lai kaoshi de] dou guo le
yesterday come take-exam DE all pass FP
'Who came to take exams (yesterday) all passed.'

(26) wo kan le [Zhangsan (zuotian) hua de]
I look ASP Zhangsan yesterday draw DE
'I had a look at what Zhangsan drew (yesterday).

(27) wo jiedai le [(zuotian) lai caifang de]
I greet ASP yesterday come interview DE
'I greeted who came for interviews (yesterday).'

A closer look at Mandarin headless relatives

Characterizing Mandarin headless relatives:

a. *de* as nominalizers (similar to *si/zo* in Tsez)
b. relativized elements undergo A′-movements (similar to wh-in-situ in Tsez)

de as a nominalizer

The marker *de* can be independently (without a following noun) used to nominalize syntactic objects in different sizes.

Evidence-1: the marker *de* can attach to bare verbs to denote entities.

(30) chi-de
eat-DE
'what could be eaten (=food)'

(31) chuan-de
wear-DE
'what could be worn (=clothing)'

Evidence-2: The marker *de* can also attach to a bare VP to derive an occupational reading.

(32) Zhangsan shi [hua hua   de]
Zhangsan be draw picture DE
'Zhangsan is a painter.'

(33) Zhangsan shi huajia
Zhangsan be painter
'Zhangsan is a painter.'

The marker *de* is selective to the VP it combines with.

The occupational reading requires that the VP denotes an action that could qualify as an occupation.

(34) * Zhangsan shi (yi ge) [zai zher da che de]
      Zhangsan be one CL at here call taxi DE
      Intended: 'Zhangsan is a person who calls taxis here.'

De functions as a nominalizer, which can take bare verbs, VPs and TPs.

Characterizing Mandarin headless relatives:

a. *de* as a nominalizer

b. relativized elements undergo A′-movements

Relativizations by A′-movements

Although the relativized elements are phonologically null in Mandarin, two pieces of evidence show that the relativized element does move.

Evidence-1: The relativization is island-sensitive.

Adverbial clause island

(35) * wo kandao le   [Zhangsan [yinwei meiyou dedao e] gandao nanguo de]
      I see ASP Zhangsan because not get   feel sad DE
      'I saw what Zhangsan felt sad because he didn't get.'

Relative clause island

(36) * wo chi le [Zhangsan yaoqing le [hui zuo e de ren] de]
      I eat ASP Zhangsan invite ASP can cook DE person DE
      'I ate what Zhangsan invited the person who can cook.'

Relativizations by A′ movements

Evidence-2: Preposition-stranding is not allowed in the relativization of Mandarin headless relatives as in overt topicalizations.

(37)   * Zhangsan, wo gen t bu shou.
         Zhangsan, I   with not familiar
         'Zhangsan, I am not familiar with.'

Similar to overt topicalization movements, the relativization resulting in prepositional stranding is not grammatical for headless relatives.

(38)   * wo hui fang san ben shu zai [ni zuotian fang shu zai e de]
         I   will put three CL book at you yesterday put books at DE
         Intended: 'I will put three books where you put books yesterday.'

Relativizations by A′ movements

Evidence-3: The relativization of indirect objects and applicative objects in Mandarin headless relatives is deviant.

(39) * wo kandao le [wo jiao (ta) jufa   de]
      I see   ASP I teach him syntax DE
      Intended: 'I saw who I taught Syntax.'

(40) * wo he   le [ni he   le e san ping jiu de] jiu
      I drink ASP you drink ASP three CL wine DE wine
      Intended: 'I drank wine on who you drank three bottles of wine on.'

This deviance is also observed in their overt counterpart English wh-movements.

(41) ?/* Which woman do you think I should give/buy perfume?

(42) * Who did you bake a cake?

Summary

Characterizing Tsez and Mandarin headless relatives:

a. Extra nominalizers are required (*si/zo* in Tsez and *de* in Mandarin)

b. Relativized elements undergo A′-movements

A theoretical question

What is the difference between English-type [+wh] headless relatives and Mandarin/Tsez-type [-wh] headless relatives in terms of category transformation?

The categorical transformation

One-element analysis for [+wh] headless relatives
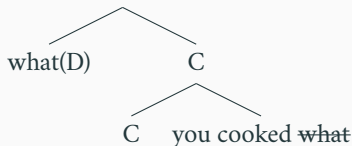
$$[\text{ what}_i \text{ John likes } t_i \text{ }]$$

Under the "one-element" analysis, the matrix verb selects no external base-generated nominal, and the category transformation is implemented by the wh-nominal (Bury and Neeleman 1999; Iatridou, Anagnostopoulou, and Izvorski 2001; Donati and Chechetto 2015).

Theoretical background

- According to labeling theory, the labels of the derived elements should come from the sets of their daughters.
- Following Citko (2008), I assume that Project Goal and Project Probe are both possible in grammar.

```
        XP                      YP
       /  \                    /  \
     XP    YP               XP     YP
```
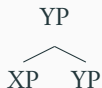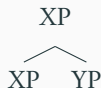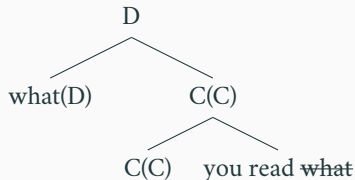
- **Empirical motivation:** *what you cooked* is ambiguous.

```
              /  \
     what(D)        C
                   /  \
                  C    you cooked w̶h̶a̶t̶
```

- **Outcome-1:** I read what you read.

```
                    D
          ┌─────────┴─────────┐
      what(D)                C(C)
                        ┌──────┴──────┐
                      C(C)      you read ~~what~~
```

- **Outcome-2:** I wonder what you read.

```
                    C
          ┌─────────┴─────────┐
      what(D)                C(C)
                        ┌──────┴──────┐
                      C(C)      you read ~~what~~
```

- How can we get to NP/DP? What are the realizations of ?? in non-wh headless relatives?
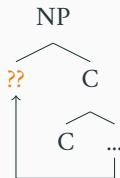
The requirement for ??

It needs to encode a [D] or [N] feature to relabel the structure into a DP or NP.

A typological picture

What we have learned from Tsez, Mandarin and English:

	type	determiner	fronted wh	nominalizer	comp	in-situ wh
[-wh]	Mandarin	-	-	✓	-	-
	Tsez	-	-	✓	-	✓
[+wh]	English	-	✓	-	-	-

(Re)labeling in cross-linguistic headless relatives: different paths to one destination

Nominal headless relatives pattern with regular nouns in the matrix clause.

Nominal headless relatives also need to bear a categorical feature [N]/[D] to satisfy the subcategory requirement.

```
              VP
            /    \
          V      XP([N]/[D])
                 /    \
         XP([N]/[D]...)  CP
```
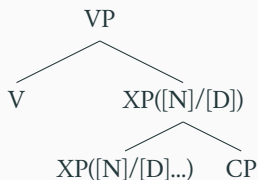
The destination: a categorical feature [N]/[D]

	type	determiner	fronted wh	nominalizer	comp	in-situ wh
[-wh]	Mandarin	-	-	✓	-	-
	Tsez	-	-	✓	-	✓
[+wh]	English	-	✓	-	-	-

> **Question**
>
> What is the distinction between [-wh] and [+wh] headless relatives?

The destination: a categorical feature [N]/[D]

Chomsky (1993): movement is triggered by the need to check features. Ideally, when movements are triggered, only the relevant features move.

However, in standard English wh-questions, it is the whole wh-phrase, not just the op-feature (or wh-feature) that moves.

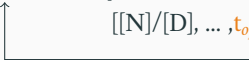(44) 'I wonder who John likes.'
Structure: I wonder [$_{CP}$ who$_i$ [$_{C'}$ Comp [$_{IP}$ John likes t_i]]]

This movement carries along with the op-feature features irrelevant to the checking, such as intrinsic features like [+human].

Takahashi (1997): a null operator can undergo a pure feature movement (op-feature) in overt syntax because it is free from PF considerations.
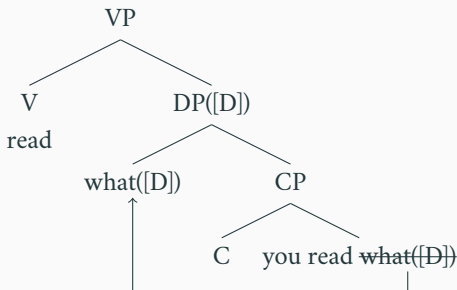
(45) [$_{CP}$ op -Comp [$_{IP}$ ... OP ...]] (order irrelevant)

                    [[N]/[D], ... ,t$_{op'}$, ... ,F$_n$]

Take-away lesson

Overt wh-movements take [N]/[D] features while op-movements don't.

wh-word	types	determiner	fronted wh	nominalizer	rel/ comp	in-situ wh
[+wh]	English	-	✓	-	-	-

```
                    VP
                  /    \
                V        DP([D])
              read       /    \
                   what([D])    CP
                      ↑        /  \
                      |       C    you read w̶h̶a̶t̶([̶D̶])̶
                      |_____|
```

[-wh] Mandarin headless relatives

wh-word	types	determiner	fronted wh	nominalizer	rel/ comp	in-situ wh
[-wh]	Mandarin	-	-	✓	-	-
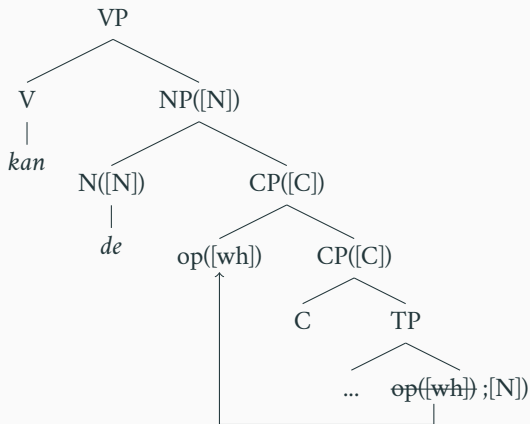
[-wh] Tsez headless relatives

wh-word	types	determiner	fronted wh	nominalizer	rel/ comp	in-situ wh
[-wh]	Tsez	-	-	✓	-	✓
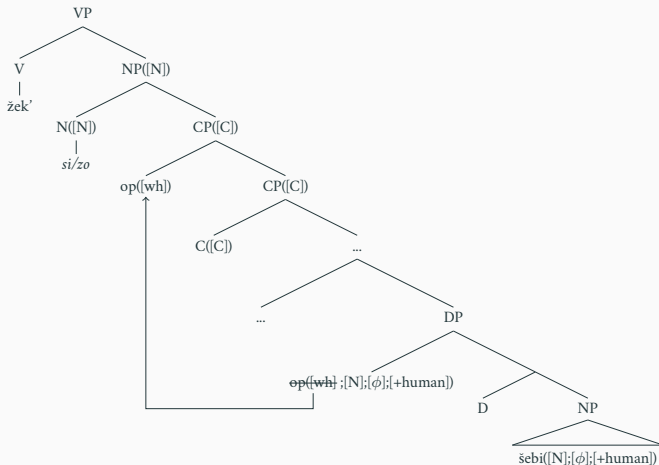
Chapter summary

Summary

- This work examined the [-wh] headless relatives in two unrelated languages, Mandarin and Tsez.

- In Mandarin and Tsez nominal headless relatives, no wh-phrase overtly moves, and a nominalizer is obligatory.

- The overt fronted wh-phrase provides [N]/[D] in [+wh] headless relatives while an extra nominalizer merges to supply [N]/[D] in [-wh] headless relatives.

- This relabelling analysis can be extended to account for headless relatives in Spanish, Polish, and Bulgarian.

Syn The categorical transformations of nominal headless relatives
(CP → NP/DP; cross-linguistic)

Syn Whether all arguments can be equally relativized (Mandarin SFR)

Sem The semantic composition of headless relatives (English FR)

Sem The semantics of headless relatives and modified bare nouns (English FR)

The semantic composition of headless relative clauses: a case study of English free relatives

- **Pied-piping:** a movement where a given expression brings along an encompassing phrase with it when it moves.

  (84)   Mary saw the person <u>to whom</u> Egbert would never talk.

  (85)   I wonder <u>whose children</u> died in the war.

- Pied-piping is degraded in English free relatives.
- Two types of degradedness in English FRs:
  - **Absolute bad (*):** Completely unacceptable.
  - **Acceptable to some speakers (*/??):** acceptability varies from speaker to speaker.

*Select-into-fronted-element

Absolute bad (*): A noun-selecting verb cannot take a [P+ wh-noun]-FR, and a who-selecting verb cannot take a [whose+N]-FR (Grosu 1994; a.o.).

(86)   * She found [with what she used to draw].
        She found [what she used to draw with].

(87)   * I consoled [whose children died in the war].
        I consoled [the persons whose children died in the war].

Acceptable to some speakers (*/?(??)): When the whole wh-phrase is selected by the matrix verb, judgments vary from "unacceptable" to "not perfect" to "perfect."

(88) */? John is digging (precisely) [with what his father was digging a moment ago].

(89) */?? I am sure that my dad will pay for [whose car I damaged].

Two Constraints in FRs

- **FR-external constraint (rigid):** The fronted string of free relatives denotes a meaning in a form that is required by the matrix predicate.
- **FR-internal constraint (violable for some speakers):** The fronted string contains only wh-expressions.

	Examples	FR-external	FR-internal	Judgments
a	She found [**what** she lost yesterday]	✓	✓	✓
b	John is digging [**with what** his father was digging]	✓	✗	✓/*
	My dad will pay for [**whose car(s)** I damage]			(w variations)
c	I met [**what** you gave him]	✗	✓	#
d	She found [**with what** she used to draw]	✗	✗	*
	John consoled [**whose child** died in the war]			

Two Constraints in FRs

- **FR-external constraint (rigid):** The fronted string of free relatives denotes a meaning in a form that is required by the matrix predicate.

- **FR-internal constraint (violable):** The fronted string contains only wh-expressions.

> **The semantic composition**
>
> The meaning of a free relative is sensitive to the form of its fronted string.

Previous studies propose that free relatives denote the maximal entities that the wh-expression ranges over (Jacobson 1988, 1995; Caponigro 2003, 2004; Chierchia and Caponigro 2013; Xiang 2021; a.o.).

⟦what was in the fridge⟧ $= \lambda x[\text{thing}(x) \land \text{in-fri}(x)]/\lambda x : \text{thing}(x) = 1.\text{in-fri}(x)$

These analyses predict the same semantics for pied-piping and non-pied-piping FRs.

⟦whom John gave the money to/to whom John gave the money⟧ $=$
$\lambda x[\text{human}(x) \land \text{give-to}(j, \text{the-money}, x)]/ \lambda x : \text{human}(x).\text{give-to}(j, \text{the-money}, x)]$

Instead, we want:

⟦to whom John gave the money⟧ $= \lambda x : x \in \{\text{to-}y|\text{hmn}(y)\}.\text{give}(j, \text{t-m}, x)]$

The ∃-account of fronted pied-piping strings (Demirok 2020)

Step-1 Within the pied-piping string (to whom), wh-indefinite moves to the edge
of the pied-piping string to scope over the pied-piping string.

(90) [whom$_1$ [to t$_1$]]

$= \lambda R_{\langle v,t \rangle}.\exists x \in \mathsf{hmn}_@[R = [\lambda e.\textsc{goal}(e) = x]]$

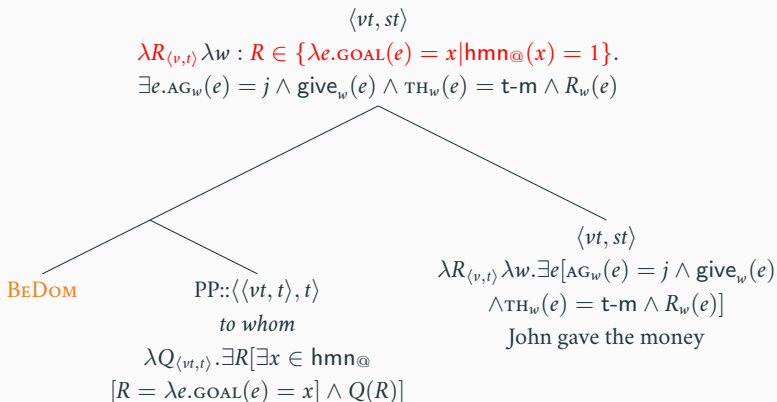**The ∃-account of fronted pied-piping strings (Demirok 2020)**

Step-2 The fronted pied-piping string as a whole is lifted to an ∃-quantifier, whose restriction is the set that the pied-piping string denotes.

(91) $\exists$ [whom$_1$ [to t$_1$]]

= $\lambda Q_{\langle vt,t\rangle}.\exists R[\underline{\exists x \in \mathsf{hmn}_@[R = [\lambda e.\textsc{goal}(e) = x]]} \wedge Q(R)]$

The semantic composition: composing with the remnant

Step-3 We restrict the domain of the remnant to the set that the fronted pied-piping string denotes by BEDOM (Xiang 2021).

$$\langle vt, st \rangle$$
$$\lambda R_{\langle v,t \rangle} \lambda w : R \in \{\lambda e.\text{GOAL}(e) = x | \text{hmn}_@(x) = 1\}.$$
$$\exists e.\text{AG}_w(e) = j \wedge \text{give}_w(e) \wedge \text{TH}_w(e) = \text{t-m} \wedge R_w(e)$$

BEDOM

PP::$\langle \langle vt, t \rangle, t \rangle$

to whom

$$\lambda Q_{\langle vt,t \rangle}.\exists R[\exists x \in \text{hmn}_@$$
$$[R = \lambda e.\text{GOAL}(e) = x] \wedge Q(R)]$$

$$\langle vt, st \rangle$$
$$\lambda R_{\langle v,t \rangle} \lambda w.\exists e[\text{AG}_w(e) = j \wedge \text{give}_w(e)$$
$$\wedge \text{TH}_w(e) = \text{t-m} \wedge R_w(e)]$$
John gave the money

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Step-4 $\mathcal{A}_w$ applies to pick out the maximal element (Xiang 2021).
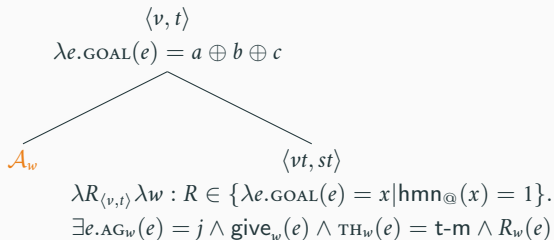
$$\langle v, t \rangle$$
$$\lambda e.\text{GOAL}(e) = a \oplus b \oplus c$$

$\mathcal{A}_w$

$$\langle vt, st \rangle$$
$$\lambda R_{\langle v,t \rangle} \lambda w : R \in \{\lambda e.\text{GOAL}(e) = x | \text{hmn}_@(x) = 1\}.$$
$$\exists e.\text{AG}_w(e) = j \wedge \text{give}_w(e) \wedge \text{TH}_w(e) = \text{t-m} \wedge R_w(e)$$

FR-external constraint: The fronted string of free relatives denotes a meaning in a form that is required by the matrix predicate.

(92)   (Context: John gave the money to Andy, Billy and Cindy.)
       *(I) met [to whom John gave the money]$_{FR}$

$$\text{VP}$$

$$\text{V}::\langle v, t \rangle$$
$$\lambda e.\text{meet}(e)$$

TYPE MISMATCH!

$$\theta::\langle e, vt \rangle$$
$$\lambda x \lambda e.\text{THEME}(e) = x$$
$$|$$
$$[\text{THEME}]$$

$$\text{FR}::\langle v, t \rangle$$
$$\lambda e.\text{GOAL}(e) = a \oplus b \oplus c$$
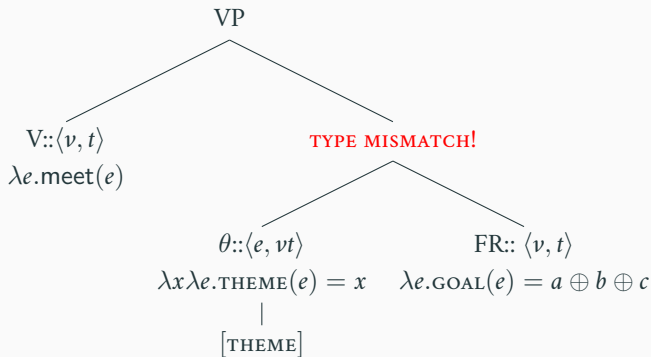
Account for the FR-external constraint

(Context: John gave the money to Andy, Billy and Cindy.)
?I gave the money [to whom John gave the money]$_{FR}$

VP::$\langle v, t \rangle$
$\lambda e[\text{give}(e) \wedge \text{THEME}(e) = \text{the-money} \wedge \text{GOAL}(e) = a \oplus b \oplus c]$

DP::$\langle v, t \rangle$
$\lambda e.\text{THEME}(e) = \text{the-money}$

VP::$\langle v, t \rangle$
$\lambda e[\text{give}(e) \wedge \text{GOAL}(e) = a \oplus b \oplus c]$

θ::$\langle e, vt \rangle$
$\lambda x \lambda e.\text{THEME}(e) = x$
|
[THEME]

DP::e
the-money

V::$\langle v, t \rangle$
$\lambda e.\text{give}(e)$

FR:: $\langle v, t \rangle$
$\lambda e.\text{GOAL}(e) = a \oplus b \oplus c$
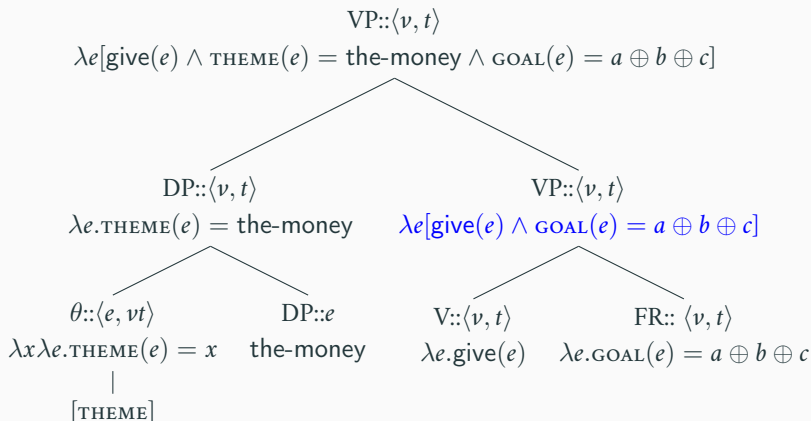
FR-internal constraint: The fronted string contains only wh-expressions.

(Context: John gave the money to Andy, Billy and Cindy.)

a. $[\![$whom John gave money to$]\!] = \{a, b, c, a \oplus b, a \oplus c, b \oplus c, a \oplus b \oplus c\}$

b. $[\![$to whom John gave money$]\!] = \{\lambda e.\text{goal}(e) = a, \lambda e.\text{goal}(e) = b,$
$$\lambda e.\text{goal}(e) = c, \lambda e.\text{goal}(e) = a \oplus b,$$
$$\lambda e.\text{goal}(e) = a \oplus c, \lambda e.\text{goal}(e) = b \oplus c,$$
$$\lambda e.\text{goal}(e) = a \oplus b \oplus c\}$$

The input for $\mathcal{A}_w$'s picking operation should be minimized, making derivation (a) preferable to (b) for its greater economy.

This preference for minimization aligns with findings in the study of focus (Büring 2016).

(93) (What does Kim do in Paris?—)

   1. Kim [WORKS]$_F$ in Paris.
   2. #Kim [works in PARis]$_F$.
   3. #[Kim works in PARis]$_F$.

(94) **Maximize Background (Büring 2016)**
   In any tree, maximize the number of (non-synonymous) constituents that are in the background.

Summary

- FR-internal and FR-external constraints suggest that the meanings of English FRs should be sensitive to the form of fronted strings.
- A compositional analysis is proposed to account for the FR-external constraint.
- This analysis generates different meanings for pied-piping FRs and non-pied-piping FRs, thereby providing the basis for explaining the FR-internal constraint.

Syn The categorical transformations of nominal headless relatives
(CP → NP/DP; cross-linguistic)

Syn Whether all arguments can be equally relativized (Mandarin SFR)

Sem The semantic composition of headless relatives (English FR)

Sem The semantics of headless relatives and modified bare nouns (English FR)

Whether all arguments can be equally relativized (Mandarin SFR)

In Mandarin headless relatives, there exists a preference for the object reading when both the subject and the object are null (Huang 1984).

(95)　　[*e* zuotian　goumai *e* de]
　　　　　yesterday buy　　DE

　　　a. ?? 'who bought (things/the things) yesterday'
　　　b. ✓ 'what was bought yesterday'

This dissertation

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Headless relatives and modified bare nouns (English FR)

When a FR admits a non-kind reading, its corresponding modified BN also admits a non-kind reading; conversely, when a FR admits a kind reading, its corresponding modified BN also has a kind reading.

(96) **Non-kind denoting free relative and modified BN**

    a. [What is swimming here right now]$_{FR}$ is $^{??}$rare these days.

    b. [Animals swimming here right now]$_{MB}$ are $^{??}$rare these days.

(97) **Kind denoting free relative and modified BN**

    a. [What costs less than 99 cents]$_{FR}$ is $^{\checkmark}$rare these days.

    b. [Things that cost less than 99 cents]$_{MB}$ are $^{\checkmark}$ rare these days.

Thank you!