What relative pronoun morphology reveals about relative clause typology

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Project

Cross-methodological approaches to syntax and semantics (XMASS) minilab
PRIMUS funding (Jul 2019 – Jun 2022)

- generative syntax
- formal semantics
- usage-based approach (corpora)
- linguistic typology
- language acquisition
- experimental work

Project *From interrogatives to relatives*

- Why can interrogative pronouns (aka wh-words) function as relative pronouns?
- What is the relation between interrogatives and relatives?
- How are relative clauses/pronouns derived from interrogative clauses/pronouns?

Project members and particular goals

Klára Matiasovitsová

- Acquisition of interrogative and relative pronouns/clauses
- Czech CHILDES corpus (Chromá et al. 2020)

Adam Pospíšil

- Interrogative and relative pronouns in Arabic vernaculars
- Fieldwork methodology

Jakub Sláma

- Czech relativization strategies
- Currently: Czech relative clauses introduced by *jak*

Hana Strachoňová

- Interrrogative and relative pronouns/clauses in Czech Sign Language
- So far no systematic investigation

This talk

- Different kinds of wh-constructions
- Cross-linguistic morphology of relative pronouns across constructions
- Sketch a nanosyntactic analysis of relative pronouns
- Syntactic/semantic analysis of individual relative constructions

Interrogative and relative constructions and pronouns

Making syntactic and semantic sense of the hierarchy

Wh-constructions

(1) **kde** spal
where slept.SG.M
'where he slept'

Interrogative (I) and embedded interrogative (EI)

(2) a. [$_{I}$ **Kde** spal?]
where slept
'Where did he sleep?'

b. Nevím, [$_{EI}$ **kde** spal].
NEG.know.1SG where slept
'I don't know where he slept.'

Wh-constructions

Unconditional (UnC)

(3) a. [$_{\text{UnC}}$ **Kde**koliv spal], (tam) snídal.
where.EVER slept there had.breakfast
'Wherever he slept, he had breakfast (there).'

b. [$_{\text{UnC}}$ Ať spal **kde**koliv], snídal (tam).
PRT slept where.EVER had.breakfast there
'Wherever he slept, he had breakfast (there).'

Correlative (CoR)

(4) [$_{\text{CoR}}$ **Kde** spal], tam snídal.
where slept there had.breakfast
'He had breakfast wher(ever) he slept.'

Wh-constructions

Light-headed relative (LHR) and (ever) free relative ((e)FR)

(5) a. Snídal tam, [$_{\text{LHR}}$ **kde** spal].
had.breakfast there where slept
'He had breakfast where he slept.'

b. Snídal, [$_{\text{FR}}$ **kde** spal].
had.breakfast where slept
'He had breakfast where he slept.'

c. Snídal, [$_{\text{FR}}$ **kde**koliv spal].
had.breakfast where.EVER slept
'He had breakfast wherever he slept.'

Headed relative (HR)

(6) Snídal v pokoji, [$_{\text{HR}}$ **kde** spal].
had.breakfast in room where slept
'He had breakfast in the room where he slept.'

Summary (Czech)

- Interrogative pronouns (wh-words) can be used in a variety of constructions in Czech.
- This is representative of most Czech wh-words, with some minor exceptions.

	Czech where
I	kde
UnC	kde+
CoR	kde
FR	kde
HR	kde

Table: Use of the Czech wh-word *kde* 'where' in wh-constructions

- It seems attractive to look for a common analysis of wh-words in all of these constructions, something that has been attempted to some extent (Caponigro 2003)

Cross-linguistic perspective

- Not all languages behave as uniformly as Czech does.
- Many possess so-called relative morphemes: usually affixes which attach to the interrogative base and derive relative pronouns.

(7) a. *ki* → *aki* 'who/which' *Hungarian*
b. *koj* → *kojto* 'who/which' *Bulgarian*
c. *pjos* → *opjos* 'who' *Greek*
d. *kje* → *kjer* 'where' *Slovenian*
e. *qué* → *el que* 'what/which' *Spanish*

- In some languages, the wh-morpheme is replaced by a relative morpheme:

(8) a. *ko* → *jo* 'which' *Hindi*
b. *was* → *das* 'what/which' *German*

Wh-constructions in Hungarian

Interrogatives

(9) János **kit** mutatott be Marinak? *Hu*
János who.ACC introduced PRT Mary.to
'Who did János introduce to Mari?'

Unconditionals: interrogative form plus the EVER morpheme

(10) Akár**ki** telefonált, elbeszélgettünk. *Hu*
EVER.who called chatted.1PL
'Whoever called, we chatted.'

Correlatives: interrogative form only in proverbs

(11) a. {**Aki**$_i$ / **Ki**$_i$} másnak vermet ás, **maga**$_i$ esik bele. *Hu*
REL.who who other.DAT pit.ACC digs himself falls in.it
'Who digs a pit for someone else, falls in it himself.'

b. {**Aki**$_i$ / ***Ki**$_i$} megette a tortát, **azt**$_i$ megbüntetjük.
REL.who who eat.PST.3SG the cake.ACC that.ACC punish.1PL
'Who has eaten the cake, that we will punish.'

Wh-constructions in Hungarian

Free relatives obligatorily use the relative form a+wh

(12) Meghívtam {**akit** csak / *akár**ki**} láttam. *Hu*
invited.1SG REL.who.ACC only EVER.who saw.1SG
'I invited whoever I saw.'

Headed relatives

(13) Azt a tornászt, {**aki** / ***ki**} elsőnek szerepel, mindig
that the gymnast.ACC REL.who who first performs always
le pontozza néhány bíró. *Hu*
down marks some judge
'The gymnast who performs first is always marked down by some judges.'

Summary (Czech and Hungarian)

- Not all languages can use interrogative pronouns across all the wh-constructions considered.
- Hungarian only uses the interrogative form systematically in (embedded) interrogatives and unconditionals and in proverbial correlatives; correlatives, free relatives, and headed relatives must involve the specialized relative form.

	Czech where	Hungarian who
I	kde	ki
UnC	kde+	ki+
CoR	kde	(a)ki
FR	kde	aki
HR	kde	aki

Table: Morphology of interrogative and (cor)relative pronouns

Extending the cross-linguistic picture

	Czech where	German what	Turkish who	Hungarian who	Bulgarian who	Hindi where	Greek who	Abaza REL.ABS
I	kde	was	kim	ki	koj	kidhar	pjos	j(ə)-
UnC	kde+	was+	kim	ki+	koj(to)+	j/kidhar+	opjos+	j(ə)-
CoR	kde	was	kim	(a)ki	kojto	jidhar	opjos	
FR	kde	was	✗	aki	kojto	jidhar	opjos	j(ə)-
HR	kde	das	✗	aki	kojto	jidhar	o opíos	j(ə)-

Table: Morphology of interrogative and (cor)relative pronouns

Implicational universal

If a relative morpheme surfaces on a pronoun in some construction in (14), it also surfaces on that pronoun in all constructions lower on the hierarchy (provided a relative pronoun can be used at all).

(14) I > UnC > CoR > FR > HR

Pancheva Izvorski 2000; É. Kiss 2002; Bhatt 2011; Fuß & Grewendorf 2014; Demirok 2017; Daskalaki to appear; Bacskai-Atkari & Dékány to appear; Arkadiev & Caponigro to appear

Extending the cross-linguistic picture

The case of Syrian Arabic

	Syrian Arabic			
	what	who	where	when
I	šu	mīn	wēn	aymat
UnC	šuma	mīnma	wēnma	aymatma
CoR	šu(ma)	mīnma	wēn	lamma
FR	šu	illi+RES	mahallma	lamma
HR	illi+RES	illi+RES	mahallma	illi+RES

Table: Interrogative and (cor)relative constructions in Syrian Arabic

- The hierarchy is defined not based on language, but based on particular wh-items.
- Syrian also demonstrates the existence of suppletion: *wēn* 'where' (Q/CoR) – *mahall* 'place' (FR/HR).
- The *ma* morpheme in Syrian Arabic is still to be explored; being highly polysemous/polyfunctional, it is probably ambivalent between the EVER morpheme (obligatory in unconditionals) and a relativizer (*mahallma* ≈ place.REL).

Pospíšil et al. in prep

Nanosyntax of relative pronouns

- Labels adopted from the clausal spine; cross-categorial fseq
- NP provides nominal restriction (ϕ-features, PLACE, TIME, etc.)
- Foc ($\approx$ Wh) turns the core indefinite to focus
- Top turns the focus to a topical referent
- Force ($\approx$ Rel) encodes embedding (relation to CP-external D)
- The functional heads operate quasi-compositionally: not on metalanguage but on referential indices.
- HRs left aside...

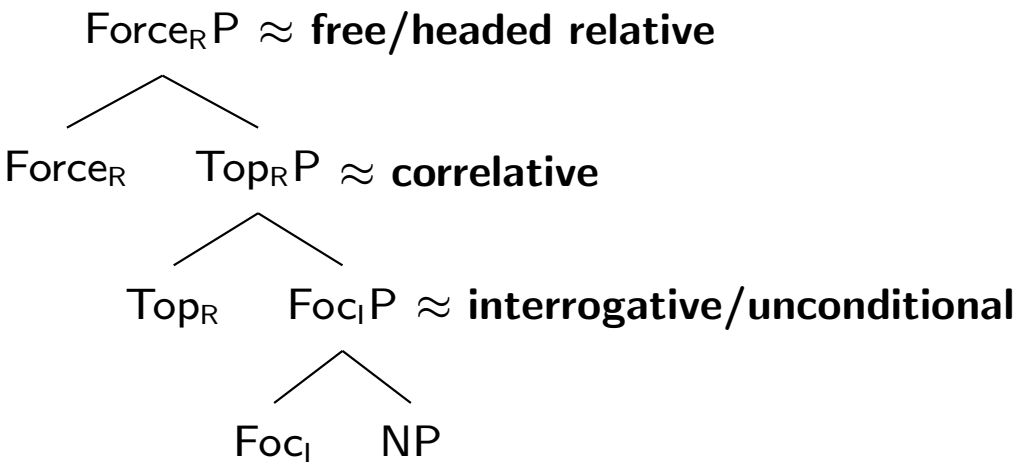
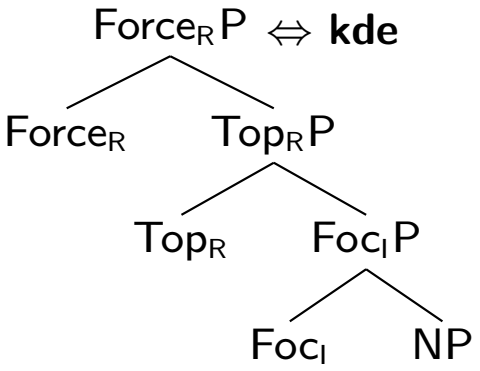


Figure: Structure of interrogative/(cor)relative pronouns

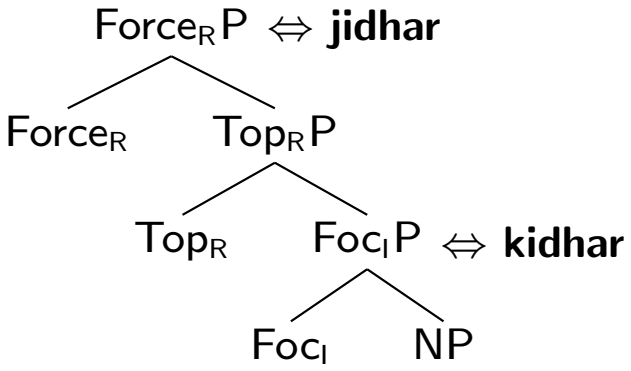
Nanosyntactic lexical entries and spellout

- The usual nanosyntactic spellout principles apply (phrasal spellout, superset, elsewhere; Starke 2009)
- Precise technical implementation left aside

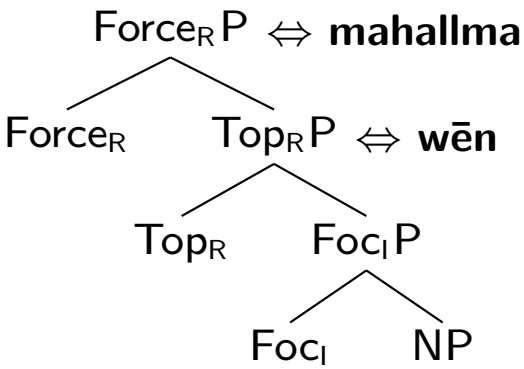
Czech



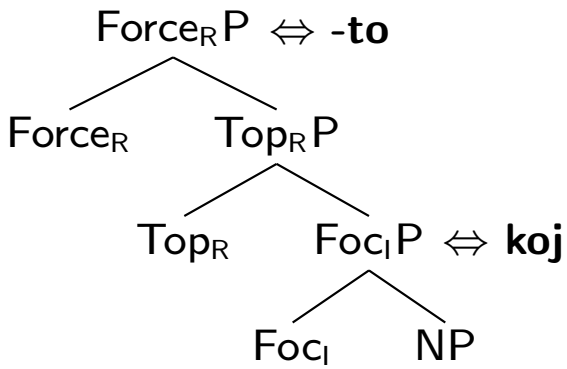
Hindi



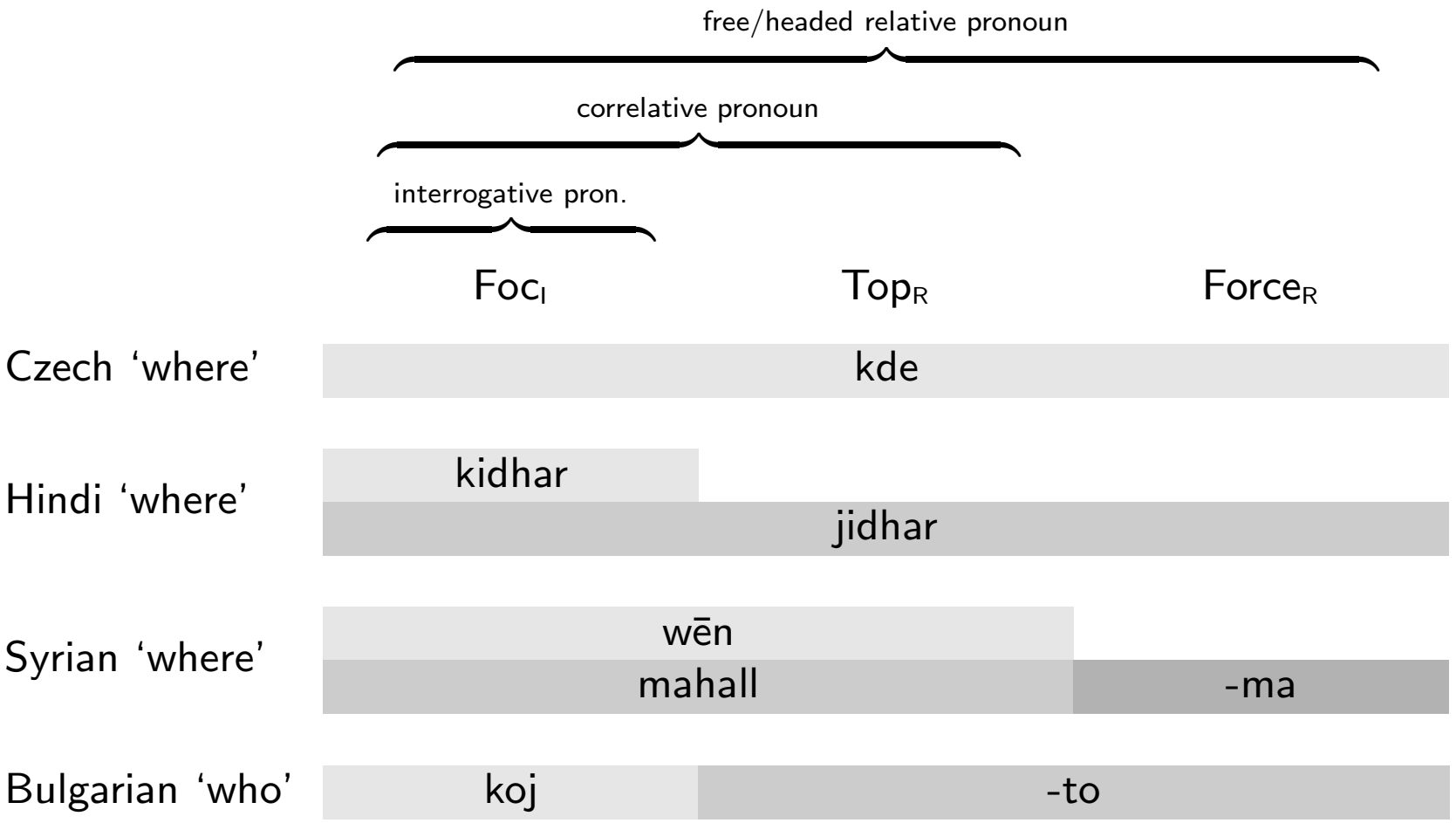
Syrian



Bulgarian



A less formal expression of the same



More general relevance of the hierarchy

Hierarchy

I > UnC > CoR > FR > HR

If a language can use a wh-pronoun for a construction X, it can use it for any construction to the left of X.

- Languages with wh-pronouns in all the constructions: most European
- Languages without wh-based HRs: Mesoamerican, Arabic
- Languages without wh-based FRs/HRs: Turkish, Chinese
- Languages without wh-based (cor)relatives: most languages

Position of wh-words in the constructions

- Wh-in-situ in FRs/HRs is extremely rare, if possible at all (potential exception: Hittite)

Diachrony

- The use of wh-words spreads to FRs and HRs via UnCs and CoRs.

Interrogative and relative constructions and pronouns

Making syntactic and semantic sense of the hierarchy

The core meaning: Interrogatives

Hierarchy

I > UnC > CoR > FR > HR

Interrogative pronouns denote restricted variables

(15) a. $[\![\text{what}]\!] = x \mid \textsc{thing}(x)$
b. $[\![\text{where}]\!] = x \mid \textsc{place}(x)$
c. $[\![\text{when}]\!] = x \mid \textsc{time}(x)$

Interrogatives denote open propositions, (16a) (Berman 1991), or alternatively the set of possible answers (set of propositions, each with a different value for the variable), (16b) (Hamblin 1973).

(16) a. $[\![\text{What is beeping?}]\!] = \textsc{beeping}(x) \wedge \textsc{thing}(x)$
b. $[\![\text{What is beeping?}]\!] = \{\textsc{beeping}(x) \wedge \textsc{thing}(x) \mid x \in D_c\}$

Answers provide a value for the variable (select a member of the set of propositions).

(17) $[\![\text{The oven is beeping.}]\!] = \textsc{beeping}(\iota x\, \textsc{oven}(x))$

Applying the meaning to unconditionals

Hierarchy

$\boxed{\text{I} > \text{UnC}} > \text{CoR} > \text{FR} > \text{HR}$

The core meaning can be applied to unconditionals (Rawlins 2013).

(18) a. Whatever is beeping, it's annoying.
b. Whatever is beeping, I can't stay here.

(19) a. $\forall x \left[\boxed{\text{BEEPING}(x) \wedge \text{THING}(x)}\right] \rightarrow \text{ANNOYING}(x)$
b. $\forall x \left[\boxed{\text{BEEPING}(x) \wedge \text{THING}(x)}\right] \rightarrow \neg\text{STAY HERE}(\text{SPEAKER}(c))$

Conditionals in formal semantics are typically treated in terms of quantification over possible worlds/situations (Kratzer 1978, 1979, 2012).

(20) $\forall x\, \forall w[\text{ACC}(w, w_0) \wedge \boxed{\text{BEEPING}_w(x) \wedge \text{THING}_w(x)} \rightarrow \text{ANNOYING}_w(x)]$

An aside on wh-based indefinites

	English where	Czech where	Hungarian who	Japanese who	Chinese what/which	Slovenian where
I	where	kde	ki	dare	shénme	kje
∃	somewhere	někde	valaki	dare-ka	shénme	nekje
∀	everywhere	všude	mindenki	dare-mo	shénme dōu	(povsod)
NPI/FCI	anywhere	kdekoli	akárki	dare-mo	shénme	kjerkoli
NEG/NCI	nowhere	nikde	senki	dare-mo	shénme	nikjer

Table: Interrogative pronouns → Indefinite pronouns

- The distribution and function of affixes deriving **indefinites** are much better studied and understood (Haspelmath 1997).
- Popular syntactic/semantic approach (Kratzer & Shimoyama 2002): indefinite-creating affixes indicate **the way the** **wh-variable** **is bound**.

(21) a. $[\![\ldots \text{somewhere} \ldots]\!] = \exists x[\ldots \boxed{x \mid \text{PLACE}(x)} \ldots]$

b. $[\![\ldots \text{everywhere} \ldots]\!] = \forall x[\ldots \boxed{x \mid \text{PLACE}(x)} \ldots]$

c. $[\![\ldots \text{nowhere} \ldots]\!] = \neg\exists x[\ldots \boxed{x \mid \text{PLACE}(x)} \ldots]$

- The binders are typically drawn from the standard **logical operators**.

Correlatives

Hierarchy

I > UnC > CoR > FR > HR

Correlatives are a bit like unconditionals, with a few important differences:
1. no EVER-morpheme, 2. obligatory anaphoric pickup of the wh-pronoun,
3. tendency towards habitual interpretations.

(22) a. **Co** pípá, **to** rozbiju.
what beeps that destroy.1SG
'I'll destroy what(ever) beeps.'

b. ***Co** pípá, nemůžu tady zůstat.
what beeps NEG.can.1SG here stay
Intended: 'I'll leave, no matter what it is beeping.'

I propose to model correlatives as conditionals of sorts (Bittner 2001; Brasoveanu 2008), where the the Kratzerian conditional universal quantifier binds not only worlds, but also (all) correlative pronouns.

(23) $\forall w, x[\text{ACC}(w, w_0) \wedge \text{BEEP}_w(x) \wedge \text{THING}_w(x) \rightarrow \text{DESTROY}_w(\text{SP}(c), x)]$

Correlatives

Building on the insights from indefinites (cf. (24)), I propose that the relative morpheme in correlatives (or, more precisely, the Top_{R} head) indicates association with the dedicated conditional/correlative operator; see (25) and its semantic representation in (26) (the 'interrogative base' is marked by a box).

(24) $[\![\ldots \text{somewhere} \ldots]\!] = \exists x[\ldots \boxed{x \mid \text{PLACE}(x)} \ldots]$

(25) **Koj**to se uči, **toj** šte spoluči. *Bg*
who.REL REFL study.3SG that.DEM will succeed.3SG
'Who studies will succeed.'

(26) $\forall w, x[\text{ACC}(w, w_0) \wedge \boxed{\text{STUDY}_w(x) \wedge \text{PERSON}_w(x)} \rightarrow \text{SUCCEED}_w(x)]$

Correlatives and unconditionals mixed in one sentence

Rudin (2009) shows that the presence/absence of *-to* on wh-words in Bulgarian multiple-wh correlatives correlates with interpretation; cf. (27).

(27) a. **Kogoto kakvoto** go boli, za nego prikazva. single pair int.
who.REL what.REL him hurts about it talks
'The person who has something hurting, talks about it.'

$\forall w, x, y[\text{ACC}(w, w_0) \wedge \text{HURT}_w(x, y) \rightarrow \text{TALK ABOUT}_w(x, y)]$

b. **Kogo kakvoto** go boli, za nego prikazva. list of pairs int.
who what.REL him hurts about it talks
'Everyone talks about whatever is hurting them.'

$\forall x\left[\text{PERSON}(x) \rightarrow \forall w, y[\text{ACC}(w, w_0) \wedge \text{HURT}_w(x, y) \rightarrow \text{TALK ABOUT}_w(x, y)]\right]$

In the present analysis, correlative wh-words (with *-to*) get bound by the correlative operator, while non-correlative (without *-to*) don't. The latter are interpreted as wh-words in unconditionals and receive wide-scope universal readings.

Free and (Light-)Headed relatives

Hierarchy

I > UnC > CoR > FR > HR

Free and (light-)headed relatives are different from all previous constructions in that they are **embedded**. The interrogative base is in a box.

(28) Sním (**to**), **co** uvaříš.
eat.1SG that.DEM what cook.2SG
'I'll eat what you'll cook.'

(29) $\textsc{eat}(\textsc{sp}(c), \iota x \boxed{\textsc{thing}(x) \wedge \textsc{cook}(\textsc{hr}(c), x)})$

Free and (Light-)Headed relatives

We can, again, build on the basic assumption that relative morphology (or, more precisely, Force_{R}), indicates a relation to an operator. This time, the operator is a **(quantificational) determiner**, such as the definiteness-related iota operator.

(30) Vzemi kakvoto iskaš. *Bg*
take.IMP what.REL want.2SG
'Take what(ever) you want.'

(31) $\textsc{take}\big(\textsc{hr}(c), \iota x \boxed{\textsc{thing}(x) \wedge \textsc{want}(\textsc{hr}(c), x)}\big)$

From correlatives to free/light-headed realtives

The step from correlatives to free/light-headed relatives has been documented diachronically (Belyaev & Haug 2014) and is also supported by typological evidence.

(32) a. **Co** uvaříš, **to** sním. correlative
what cook.2SG that.DEM eat.1SG

b. Sním (**to**), **co** uvaříš. free/light-headed relative
eat.1SG that.DEM what cook.2SG
'I'll eat what you'll cook.'

This can be approached by the so-called E-type approach to "donkey-anaphoric" pronouns, of which pronouns in consequents of conditionals/correlatives are an example.

(33) [what you cook], I'll eat that [what you cook]

No wh-in-situ in FRs/(L)HRs

Despite their superficial similarity, correlatives and free/(light-)headed relatives exhibit an important difference.

No wh-in-situ in relatives

Relative pronouns in free, light-headed, and restrictive headed relatives must not be in-situ.

An example of this is Hindi, which allows wh-in-situ correlatives, but not corresponding wh-in-situ restrictive headed relatives:

(34) a. **ek-bhii kitaab** [$_{HR}$ **jis-kii** Ram-ne taariif kii thii] Mina-ne
one-even book REL-GEN Ram-ERG praise do be Mina-ERG
mujhe nahiiN dikhaayii
me.DAT NEG show

b. #**ek-bhii kitaab** [$_{HR}$ Ram-ne **jis-kii** taariif kii thii] Mina-ne
one-even book Ram-ERG REL-GEN praise do be Mina-ERG
mujhe nahiiN dikhaayii (Rajesh Bhatt, p.c.)
me.DAT NEG show
'Mina didn't show me any book that Ram had praised.'

No wh-in-situ in FRs/(L)HRs

The reason why wh-ex-situ is obligatory in relatives is that the licensing operator – the determiner – does not require a proposition as its argument, but rather a **property**. The relative pronoun movement is instrumental in deriving this property – by lambda-abstraction.

(35) a. $[\![\text{you cook what}]\!] = \boxed{\text{COOK}(\text{HR}(c), x)}$

b. $[\![\text{what you cook}]\!] = \lambda x \big[\boxed{\text{COOK}(\text{HR}(c), x)} \big]$

c. $[\![\text{DET what you cook}]\!] = \iota x \big[\boxed{\text{COOK}(\text{HR}(c), x)} \big]$

Summary

The family of (cor)relative pronouns can be analytically assimilated to indefinite pronouns, provided that we assume that the common syntactic/semantic denominator of indefinite/relative morphology is **the indication of a relation to a quantificational operator**.

- *Indefinite pronouns*

  (36) ∀/∃/¬/ . . . [. . . IND.AFFIX-wh . . .]

- *Correlative pronouns*

  (37) IF-CORR [. . . CORR.AFFIX-wh . . .]

- *Relative pronouns*

  (38) DET [REL.AFFIX-wh . . .]

Conclusion

Hierarchy

I > UnC > CoR > FR > HR

	Czech where	German what	Turkish who	Hungarian who	Bulgarian who	Hindi where	Greek who	Abaza REL.ABS
I	kde	was	kim	ki	koj	kidhar	pjos	j(ə)-
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CoR	kde	was	kim	(a)ki	kojto	jidhar	opjos	
FR	kde	was	✗	aki	kojto	jidhar	opjos	j(ə)-
HR	kde	das	✗	aki	kojto	jidhar	o opíos	j(ə)-

Table: Morphology of interrogative and (cor)relative pronouns

- Interrogative forms are basic.
- Relative pronouns are derived from interrogative ones.
- Different languages make different cut-off points within the paradigm.
- I proposed a (nano)syntactic analysis of relative pronouns and constructions which can make sense of the observed paradigm.

Conclusion

THANK YOU!

Hierarchy

I > UnC > CoR > FR > HR

	Czech where	German what	Turkish who	Hungarian who	Bulgarian who	Hindi where	Greek who	Abaza REL.ABS
I	kde	was	kim	ki	koj	kidhar	pjos	j(ə)-
UnC	kde+	was+	kim	ki+	koj(to)+	j/kidhar+	opjos+	j(ə)-
CoR	kde	was	kim	(a)ki	kojto	jidhar	opjos	
FR	kde	was	✗	aki	kojto	jidhar	opjos	j(ə)-
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