

# From interrogatives to relatives: A comprehensive account of wh-constructions\*

Radek Šimík

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## Abstract

This chapter looks at the mutual relation among a number of types of wh-constructions. It proposes that wh-constructions (and wh-words) are organized in what I call a wh-hierarchy – beginning with simplest wh-interrogatives, going via (un)conditionals and correlatives, free relatives, light-headed relatives, and finishing with the most complex headed relatives. This hierarchy is claimed to follow from an incremental structural growth of wh-words, mirroring the growth of the respective wh-clauses (foc-top-rel-mod). The hierarchy receives empirical support from many grammatical and linguistic domains, particularly morphology (wh-word lexicalization patterns), syntax (wh-in-situ vs. ex-situ, structural height of wh-movement landing site), typology (cross-linguistic availability of wh-words in the individual constructions), diachrony, and L1-acquisition. The chapter builds on data from a range of genealogically and geographically distant languages, including Indo-European, Uralic, Caucasian, Mesoamerican, or Papuan.

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\*Acknowledgements to be added

# 1 Introduction

Wh-words are extremely versatile linguistic devices that have fascinated and puzzled linguists for decades (Katz & Postal 1964; Hamblin 1973; Chomsky 1977; Karttunen 1977; Reinhart 1998; Caponigro 2003; Cable 2010; Kotek 2019; among many others) and whose behavior is believed to reflect some of the core properties of both syntax and semantics. As succinctly summarized by Caponigro & Fălăuș (2019), wh-words are “logical” in that they represent a well-defined closed class of expressions which are involved in logical operations and relations like set-formation, lambda-abstraction, quantification, and more generally operator–variable relations. As such, wh-words belong to the essential toolbox of virtually any natural language.<sup>1</sup>

Probably the first use of wh-words that crosses one’s mind is the interrogative use; see (1a,b). Another prominent use, familiar to speakers of many languages of Europe, is that of a relative pronoun as in the headed relative in (1h). Besides nominally headed relatives, wh-words are productively employed in other types of relative clauses, including headless relatives (free or light-headed), as in (1e,f,g), or correlatives and unconditionals, as in (1c,d). Last but not least, wh-words are very frequent as derivational bases for indefinite pronouns (*somewhere*, *anywhere*) and can often act as indefinite pronouns themselves.

- |     |    |  |       |
|-----|----|--|-------|
| (1) | a. | [What did Tom cook?]   | I     |
|     | b. | I know/asked [what Tom cooked].  | EI    |
|     | c. | [Was Tom gekocht hat], das hat Susi gegessen.<br>what Tom cook.PTCP has that.DEM has Susi eat.PTCP<br>'Susi ate what Tom cooked.' / 'Whatever Tom cooked, Susi ate it.'        | CoR   |
|     | d. | [Whatever Tom cooked], I ate it / I wasn't at the party.   | UnC   |
|     | e. | Sue ate [what Tom cooked].   | (p)FR |
|     | f. | Sue ate [whatever Tom cooked].   | eFR   |
|     | g. | Susi hat {das / alles} gegessen, [was Tom gekocht hat].<br>Susi has that.DEM everything eat.PTCP what Tom cook.PTCP has<br>'Susi ate the things / everything that Tom cooked.' | LHR   |
|     | h. | Sue ate the meal [which Tom cooked].   | HR    |

In this chapter, I focus on the relative facet of wh-words and compare it to the interrogative one, arguing that the available evidence, drawn from diverse linguistic domains, strongly points to the following thesis:

- (2) Wh-based relative pronouns/clauses are derived from interrogative ones.

More specifically, I argue that the use of wh-words across the types of relative constructions exemplified in (1) is constrained by the wh-hierarchy (3): with interrogatives at the bottom of the hierarchy, nominally headed relatives at their top, and (un)conditionals, correlatives, free relatives, and light-headed (also: pronominally headed) relatives – in that order – in between.

(3) **Wh-hierarchy**

I < UnC < CoR < FR < LHR < HR

I will show that the hierarchy is a useful tool for modeling morphosyntactic generalizations pertaining to wh-phenomena, it constrains the cross- and intra-linguistic availability of wh-words in the respective constructions, and has a potential to contribute to our understanding of how wh-words and constructions evolve both at the level of language acquisition and diachronic development.

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<sup>1</sup>The single notable exception known thus far is Abaza, in which wh-words are claimed to be expressed by verbal morphology (Arkadiev 2020).

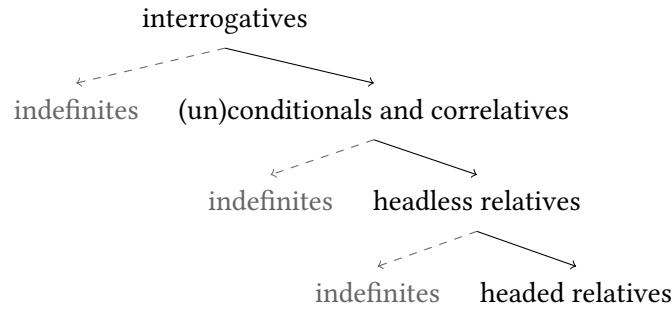


Figure 1: Relation between the (simplified) wh-hierarchy and indefinites

The focus of this chapter is thus on non-interrogative uses of wh-words *which function as constitutive members of clausal constructions*. In this latter aspect they are different from indefinites (indefinite pronouns or determiners; also called indeterminates), whose distribution is less closely tied to particular constructions. In order not to leave the issue of indefinites in complete void, the graph in Figure 1 presents a hypothesis of how a simplified version of the wh-hierarchy is related to indefinites. (“Headless” unites free and light-headed relatives; Lehmann 1984; Caponigro 2021.) The idea is that indefinites can “branch off” from wh-constructions at various points of the hierarchy. This hypothesis will not be explored in this chapter. Relevant discussion and particular examples of the different sources of wh-based indefinites can be found, e.g., in Haspelmath (1997); Ramchand (1997); Jayaseelan (2001); Bylinina & Testelets (2005); Šimík (2020); Hiraiwa (2020); Hiraiwa & Nakanishi (2021); Rybová (in prep).

The chapter is organized as follows. Section 2 looks at the wh-hierarchy from the perspective of wh-word morphology and proposes to model the morphological patterns in the framework of nanosyntax. Section 3 demonstrates how the wh-hierarchy and the nanosyntactic structure of the wh-word get integrated in a compositional syntactic–semantic treatment of the wh-constructions under discussion. Section 4 shows the relevance of the wh-hierarchy for the cross-linguistic availability of the different types of wh-constructions. Section 5 is concerned with two relevant syntactic generalizations – the lack of relative wh-in-situ and the correlation between wh-construction type and the landing site of wh-movement – and suggests how they could be understood from the perspective of the wh-hierarchy. Section 6 briefly discusses two broader issues – the diachronic development of wh-constructions and their L1-acquisition. I will show that there is a good deal of evidence that wh-hierarchy constrains the two types of processes. Section 7 concludes and highlights the most important open issues in the study of wh-constructions.

## 2 The (nano)syntactic nature of the hierarchy

I propose to model the simplified hierarchy in (nano)syntactic terms, where the “<” sign corresponds to “is structurally contained in” or “is dominated by”, as illustrated by the schematic representation of a wh-pronoun in 2. In that I follow the tradition of representing pronouns as syntactic phrases rather than heads (see Cardinaletti & Starke 1999, Déchaine & Wiltschko 2002, and Barbiers et al. 2010, Wiland 2018, or Ruys to appear for wh-words specifically) and of allowing superset-based phrasal spellout (Starke 2009). The NP corresponds to a wh-word whose ontological category (‘what’ vs. ‘where’) is determined by N. The complex left branch of the NP, dominated by MOD, corresponds to a wh-morpheme used in headed relatives. Its proper subsets then correspond to wh-morphemes used in wh-words lower on the hierarchy. The hypothesized functional structure that lexicalizes the wh-morpheme mirrors the standard cartographic structure of clausal left periphery (Rizzi 1997, 2001 and much subsequent literature). The interrogative pronoun corresponds to FOC+N. The [foc] feature turns the predicative base into a restricted variable specified to be bound by a question operator. I will assume that the interrogative pronoun can also be used in unconditionals (Rawlins 2013). The [top] feature in the correlative pronoun contributes to making the variable topical in the sense that it must be picked up by

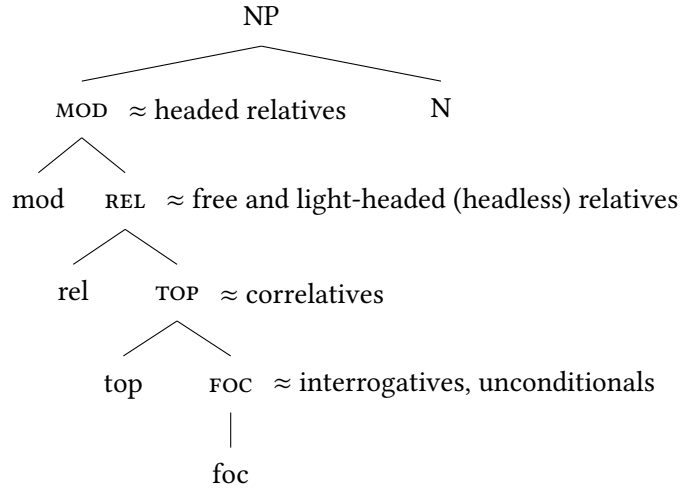


Figure 2: (Nano)syntactic representation of the wh-hierarchy

a covarying pronoun and commented on in the consequent of a conditional-like biclausal structure. The headless relative pronoun is derived by the [rel] feature and the result amounts to a lambda-abtractor (combined with a restrictor) which turns a proposition into a property of entities. The result can then directly participate in restricting the denotation of a determiner phrase. Finally, the headed relative pronoun is derived by the further addition of [mod], which mediates the relation between the relative clause and its nominal head, amounting to intersective predicate modification.

A nanosyntactic treatment of wh-words receives support from the cross-linguistic morphological patterns exemplified in Table 1, which can be summarized by the generalization (4).<sup>2</sup>

(4) **Morphology of wh-words**

A wh-word used in some wh-construction is morphologically based on the corresponding wh-word used in a wh-construction which is lower on the wh-hierarchy.

	I	UnC	CoR	–HR	HR	Source (partial)
Czech ‘where’	kde	kde+	kde	kde	kde	Šimík 2016
Komnzo ‘what’	ra	ra+	ra	ra	ra	Döhler 2018; p.c.
German ‘what’	was	was+	was	was	das	Fuß & Grewendorf 2014
Turkish ‘who’	kim	kim	kim	×	×	Demirok 2017a
Syrian Ar. ‘where’	wēn	wēn+	wēn(ma)	mahallma	mahallma	Ouras Aljani p.c.
Hungarian ‘who’	ki	ki+	(a)ki	aki	aki	É. Kiss 2002
Bulgarian ‘who’	koj	koj(to)+	kojto	kojto	kojto	Rudin 2009
Hindi ‘where’	kidhar	j/kidhar+	jidhar	jidhar	jidhar	Bhatt 2011
Greek ‘who’	pjos	opjos+	opjos	opjos	o opjos	Daskalaki 2020
Slovenian ‘where’	kje	kjer+	kjer	kjer	kjer	Mitrović 2016
Abaza ‘REL.ABS’	j(ə)-	j(ə)-	?	j(ə)-	j(ə)-	Arkadiev & Caponigro 2021

Table 1: Morphology of interrogative and (cor)relative pronouns

While some languages (Czech, Komnzo) retain the interrogative form of wh-words across the wh-hierarchy, others introduce changes along the wh-hierarchy. The shaded area shows where the interrogative morphology gets obligatorily augmented (Hungarian, Bulgarian), replaced (Hindi), where the whole wh-word becomes suppletive (Syrian Arabic), or where it becomes completely unavailable (Turkish). If the morpheme deriving a non-interrogative wh-word – call it the REL-MORPHEME – is in

<sup>2</sup>Descriptively speaking, the generalization (4) does not subsume the pattern in German and Hindi. Nevertheless, it does apply at a more abstract analytical level; see below.

	mod	rel	top	foc	N
Czech WH	k-				BASE
Turkish ‘who’			kim		
Hindi interrogative WH				k-	BASE
Hindi (cor)relative WH	j-				BASE
German WH		w-			BASE
German HR WH	d-				BASE
Slovenian WH+REL	-r			k-	BASE
Greek WH+REL	o[DET]	o-		p-	BASE

Table 2: Examples of lexical entries of wh-morphemes/words

brackets (as in the Hungarian (*a*)*ki*), it means that it is optional to some degree, possibly with interpretive consequences. In Hungarian, for instance, interrogative wh-words in correlatives sound proverbial (cf. É. Kiss 2002); their relative counterparts – prefixed by *a-* – are neutral and productive. The “+” in the unconditional row indicates the need to include the ever-morpheme, such as *koli(v)* in Czech (Šimík 2018), *ḗipote* in Greek (Giannakidou & Cheng 2006), or its functional analog, such as the subjunctive mood in Bulgarian (Pancheva Izvorski 2000). I do not take the ever-morpheme to be an instance of the rel-morpheme. Even though they can have the same morphological exponent (e.g. the Syrian Arabic *ma*), this is not generally the case (e.g. in Greek or Slovenian). The table includes Abaza, a Caucasian language, which, according to Arkadiev & Caponigro (2021), does not use wh-words at all. Instead, it uses what the authors consider relative verbal morphology throughout the paradigm.<sup>3</sup>

Table (4) sketch the way wh-morphemes or wh-words are lexicalized in selected languages/wh-words. In Czech the wh-morpheme *k-* lexicalizes the whole mod-rel-top-foc sequence and can thus be used to spell out any subset of it – [foc] in interrogatives (and unconditionals), [top+foc] in correlatives, [rel+top+foc] in free and light-headed relatives, and [mod+rel+top+foc] in headed relatives. The wh-word *kim* in Turkish lexicalizes the [top+foc] sequence together with the nominal base (reflecting the fact that Turkish has no dedicated wh-morpheme). This makes the wh-be available in interrogatives, unconditionals, and correlatives, but – due to the lack of higher functional structure – not in relative clauses. Hindi and German represent cases in which the interrogative wh-morpheme spans a proper subpart of the sequence; the whole sequence is lexicalized by a different piece of morphology. In German, for instance, the [top+foc] sequence (employed in correlatives) finds a lexical match in both *w-* and *d-* because both are a superset of [top+foc]. The reason why *w-* spells out the sequence is that it provides a more specific match than *d-* (Starke 2009). Yet another situation obtains in Slovenian and Greek, where the sequence is spelled out by multiple pieces of morphology – a phenomenon known as stacking (here “wh-stacking”; cf. case-stacking; Caha 2009; Assmann 2014). In Greek, for instance, the wh-morpheme *p-* is preserved when the wh-word acquires more complex functions. The sequence [rel+top] is spelled out by the additional prefix *o-* and the [mod] feature by the determiner-like element *o*.<sup>4</sup>

It is important to emphasize that the analysis is preliminary because it glosses over complex ana-

<sup>3</sup>The sources are “partial” in the sense that the paradigms provided are rarely discussed in full. I try to provide a solid reference which can help the reader search for further relevant references.

<sup>4</sup>It is evident that the determiner is not just an atomic feature [mod], but in fact a more complex structure hosting its own nominal features; see (i). A comparable situation obtains in some Romance languages (cf. the Spanish relative pronoun *el quién*, literally ‘the.MASC who’).

(i) o maθitis [HR jia ton opio mu milises]  
the student.NOM about MOD.PL.ACC REL.which.PL.ACC CL.1SG.GEN talked.2SG  
‘the student about whom you talked to me’

(adapted from Daskalaki 2020:288)

lytical that arise in the nanosyntactic framework, esp. pertaining to the contrast between prefixation and suffixation (Starke 2018; Wiland 2018). Nevertheless, I hope that the present observations (Table 1 and the analytical sketch couched in nanosyntax (Figure 2 and Table (4)) serve as a good starting point for further work on these issues.

An attentive reader will have noticed that the Greek and Slovenian pattern is not predicted by the proposed analysis. The reason is that wh-words used in unconditionals have the same featural makeup as those in interrogatives. The fact that unconditional wh-words obligatorily make use of the rel-morpheme in these two languages is thus unexpected. One potential response to this problem is to assume that the wh-word itself is in fact a hidden relative clause. This *prima facie* dubious assumption is empirically motivated by the fact that wh-words and relatives – and free relatives in particular – can in fact alternate in unconditionals. Consider the Slovenian unconditionals in (5), taken from Šimík (2020: 14) (glosses adapted; structural description added). Example (5a) is a canonical unconditional, making use of the relative wh-word *kdor* ‘who.REL’ and the ever-morpheme *koli*. Example (5b), on the other hand, is what I call a doubling unconditional. I argued in Šimík (2020) that doubling unconditionals involve free relative clauses (as indicated by the FR constituent) and that plain unconditionals can be derived from their doubling counterparts by relative sluicing. The assumption that (5a) involves sluicing (or more precisely an antecedent-contained deletion of the TP *pride* ‘comes’, conditioned by identity with the matrix TP) is supported by the optional left-peripheral particle *že*, which can “survive” the sluicing (cf. Marušič et al. 2018). The relative operator origin of the wh-word *kdorkoli* ‘whoever’ is thus a plausible explanation of the use of the relative morpheme *-r* on it. It remains to be seen to what extent this analysis is applicable to Greek.<sup>5</sup>

- (5) a. Naj pride kdorkoli (že), bom zadovoljen.  
 let come.3SG who.REL.EVER PRT will.be.1SG satisfied  
 ‘Whoever comes, I’ll be happy.’
- b. Naj pride [<sub>FR</sub> kdor (že) pride], bom zadovoljen.  
 let come.3SG who.REL PRT come.3SG will.be.1SG satisfied  
 ‘Whoever comes, I’ll be happy.’

### 3 Integrating wh-words in the wh-constructions: Proof of concept

In this section, I go through the individual constructions and look at how the wh-words in them interact – syntactically and semantically – with the clausal level. I assume a tight syntactic and semantic relation between the features forming wh-pronouns and clause-level operators essential in deriving the corresponding wh-clauses. In syntax, this can be modeled by the Agree relationship, where the operator (often covert) functions as the probe and the corresponding features on the wh-word (spelled out as part of the wh-word) as the goal. For purposes of the syntax–semantics interface, the goal functions as an index which is bound by a dedicated operator – the probe. In some cases (questions, unconditionals, correlatives), this probe–goal relation maps to a binding relation in semantics; in others (relative clauses), the probe–goal relation is established in order to trigger movement of the wh-phrase.

The assumed logical forms for the individual constructions are schematized in (6). The LF that corresponds to the wh-clause – possibly a subpart of the construction – is framed for clarity. The wh-word used in interrogatives and unconditionals is couched in a clause which corresponds to a FocP (or WhP; Rizzi 2001). The wh-clause has a Hamblin (1973)/Karttunen (1977)-style interrogative semantics, i.e., a set of propositions. This approach to unconditionals is due to Rawlins (2013): the wh-clause corresponds to a wh-interrogative, which functions as an antecedent of a conditional, i.e., a restrictor

<sup>5</sup>It is also possible that the relative morpheme is a remnant of diachronic development. In Slovenian, the relative morpheme does not only appear on ever-indefinites (*kdorkoli*), but also on negative concord indefinites, cf. *nikdor* ‘anybody/nobody’, where it is less likely that sluicing is involved synchronically. Notice, however, that there is independent evidence for sluicing as synchronic/diachronic source of wh-based indefinite forms (Haspelmath 1997; Bylinina & Testelets 2005; Hiraiwa & Nakanishi 2021).

of a modal operator (MOD); (6b). The additional complexities will be briefly discussed below. Wh-clauses in correlatives correspond to TopPs. The operator Cor introduces a biclausal, conditional-like structure and binds the wh-word in the antecedent and a covarying topical pronoun in the consequent. Relative clauses involve a RelP, which is structurally higher than FocP and TopP. The Rel head triggers the movement of the wh-phrase into its specifier. There, having the index on [rel+top+foc] percolated up to the moving phrase, the wh-phrase functions as a lambda-abstractor (Heim & Kratzer 1998). In headless relatives, the resulting property becomes an argument of a determiner. In headed relatives, there is an additional step: the [mod] feature, bearing an index of its own, triggers the insertion of the Mod projection, which mediates the relation between the relative clause and its nominal head.

- (6) a.  $\boxed{[_{\text{FocP}} Q_i [_{\text{TP}} \text{Dan cooked } [_{\text{FOC}_i\text{-THING}}]]]}$  questions
- b.  $[_{\forall}] [_{\text{MOD}} [ \boxed{[_{\text{FocP}} Q_i \text{EXH}_j [_{\text{TP}} \text{Dan cooked } [[[_{\text{FOC}_i\text{-THING}}] \text{ever}_j]]}] } ] ] [\psi]$  unconditionals
- c.  $\boxed{[_{\text{TopP}} \text{Cor}_i [_{\text{TP}} \text{Dan cooked } [_{\text{TOP}_i\text{-THING}}]]]} [\psi[x_i]]$  correlatives
- d. DET  $\boxed{[_{\text{RelP}} [_{\text{REL}_i\text{-THING}}]_{i/1} \text{Rel}_i [_{\text{TP}} \text{Dan cooked } t_1]]}$  headless relatives
- e. DET  $\boxed{[_{\text{ModP}} \text{NP Mod}_j [_{\text{RelP}} [[[_{\text{mod}_j+\text{REL}_i}\text{-THING}}]_{i/1} \text{Rel}_i [_{\text{TP}} \text{Dan cooked } t_1]]]}]$  headed relatives

The idea that overt morphology – here wh-morphology – is not directly or at least not “fully” interpreted, but rather indicates the presence of a higher interpretable covert operator (here: Q, Cor, Mod, but also EXH) gained momentum in the work of Kratzer & Shimoyama (2002/2017) and was later fruitfully adopted across frameworks and in the analysis of various empirical phenomena including indefinites or indeterminates (Kratzer & Shimoyama 2002; Butler 2004; Yanovich 2005), interrogative wh-words (Beck 2006; Romero & Meertens 2022), negative polarity and free choice items (Chierchia 2006, 2013 and much subsequent work), negation and negative concord items (Zeijlstra 2004), modal expressions (Zeijlstra 2007), ever free relatives and unconditionals (Aloni 2007; Rawlins 2013; Hirsch 2016; Šimík 2018; Fălăuş & Nicolae 2022), and recently also focus-sensitive, scalar, and aspectual particles (Mihoc 2021; Bassi et al. 2022; Branam & Erlewine 2022).

The reader will have noticed that the first three constructions (I, UnC, CoR) involve a wh-in-situ syntax–semantics and the latter two ( $\pm$ HR) a wh-ex-situ syntax–semantics. This is motivated both theoretically and empirically. The theoretical motivation is that while the wh-clauses in the first three constructions can, in principle, be modelled by (open-)proposition-based semantics, the relative wh-clauses must, necessarily, involve the step of turning the proposition into a property – the only possible input for intersective modification with nominals and for restricting nominal determiners. The empirical motivation will be discussed in section 5; it is based on the generalization that while there are, cross-linguistically speaking, wh-in-situ questions, unconditionals, and correlatives, there are no wh-in-situ relative clauses. I would like to emphasize that the proposed syntax–semantics represents a certain “necessary minimum” for modelling the individual constructions. It is conceivable that in some constructions or in some languages, a more complex syntax–semantics is utilized for the “simpler” constructions. For instance, the property derived by wh- (or rel-) movement can function as input for deriving question semantics (see Xiang 2021 for a recent account along these lines). Sometimes this is evident even in overt syntax: Spanish, for instance, can use both interrogatives and free relatives for encoding embedded questions; see (7) (adapted from Kellert 2018: 78–79).<sup>6</sup>

- (7) a. No sé  $[_{\text{EI}}$  de qué  $[_{\text{INTER}}$  hablas].  
NEG know of what.INTER speak.2SG

<sup>6</sup>Other languages which rely on a relativization strategy (even a headed relativization strategy) to express embedded questions, albeit not with wh-words, include Gungbe (Lipták & Aboh 2013), Hausa and Akan (Zimmermann 2018).

- b. No sé [FR de lo que hablas].  
 NEG know of REL what speak.2SG  
 ‘I don’t know what you are talking about.’

In what follows, I show how the logical forms proposed in (6) can be interpreted. My intention is not to provide original analyses, but to lay out a proof of concept, crucially building on existing analyses and adapting them to the assumptions adopted here.

### 3.1 Interrogatives

An interrogative pronoun is formed by the [foc] feature, which contributes an index to be bound by a question operator in the clausal left periphery, as schematized in (8a), repeated from above.<sup>7</sup> The proposal is inspired by Beck (2006) and Eckardt (2007); see also Romero & Meertens (2022) for a recent refinement. The denotation of the [foc]-marked wh-word *what* is a restricted variable; (8b).<sup>8</sup> The input to the Q-operator is an open proposition, see (8c), which the Q-operator turns into a standard question meaning, formalized here, for simplicity’s sake, as a set of propositions which correspond to the possible answers (Hamblin 1973).<sup>9</sup> An important aspect of the analysis is that the wh-word itself is not interrogative. It only carries a feature – here called [foc] – which enters into an Agree/binding relationship with a left-peripheral operator (Q), which is the one that brings about the interrogative interpretation.

- (8) What did Dan cook?
- a.  $[\text{FOCP } Q_i \text{ Dan cooked } [\text{FOC}_i \text{ what}]]$
  - b.  $[[\text{FOC}_i \text{ what}]]^g = g(i) : \text{THING}_{g(n)}(g(i))$
  - c.  $[[\text{Dan cooked } [\text{FOC}_i \text{ what}]]]^g$   
 $= \lambda w[\text{THING}_w(g(i)) \wedge \text{COOKED}_w(\text{DAVE}, g(i))]$
  - d.  $[[Q_i \phi]]^g = \{p : \exists x[p = [[\phi]]^{g[i \rightarrow x]}]\}$
  - e.  $[[[\text{FOCP } Q_i \text{ Dan cooked } [\text{FOC}_i \text{ what}]]]]^g$   
 $= \{p : \exists x[p = \lambda w[\text{THING}_w(x) \wedge \text{COOKED}_w(\text{DAVE}, x)]]\}$

This semantics is an in-situ semantics, i.e., it does not require wh-movement (overt or covert) in order for the question interpretation to arise. That wh-movement is not *required* does not mean, however, that it is not *possible*. There are, in principle, two options for analyzing wh-movement (ex-situ) structures in interrogatives. Either the wh-movement is semantically vacuous (the meaning is the same before and after movement; see e.g. Kotek 2016), or it triggers lambda-abstraction and thus is of the REL-type (see (cf. Xiang 2021). The former analysis is fully consistent with the current account, i.e., requires no extra assumptions about the semantics of wh-questions. A question that it gives rise to is what motivates the wh-movement (or rather the “movement of a wh-word”) if not lambda-abstraction (or, possibly, quantification). Motivations that have been explored include focus-licensing (Sabel 1998; Stepanov 1998), exhaustiveness semantics (Horvath 2013), or prosodic considerations (Richards 2010). The latter analysis, from the perspective of the current approach, bears the burden of proof. To sum up, while the proposed syntax–semantics is in-situ-based, it is consistent with the movement of wh-words, too. The same holds of wh-words in unconditionals and correlatives, to which we turn now.

<sup>7</sup>It has recently been argued that the relation between the wh-word and the question operator is not direct, but rather mediated by the so-called Q-particle, which has a choice-functional semantics (Hagstrom 1998; Cable 2010). I believe that my present analysis can be reconciled with these proposals, but I will not attempt to do it here.

<sup>8</sup>Beck (2006) crucially assumes, following Kratzer 1991, that the index is interpreted by a distinguished assignment specifically designed to interpret focus. The presentation here is simplified.

<sup>9</sup>As shown in (8d), the meaning of Q is defined syncategorematically. No lambda-abstraction over the variable introduced by the wh-word is implicated in the analysis. (See Beck 2006 for a more detailed, albeit somewhat different implementation.)



### 3.2 Unconditionals

Unconditionals are essentially interrogatives used as antecedents of conditionals (Rawlins 2013).<sup>10</sup> I assume that the *wh*-word itself is simply interrogative (it carries the [foc] feature and enters into an Agree relationship with *Q*). Yet it is typically accompanied by an additional morpheme – what I call the *ever*-morpheme – which adds semantic complexity in that it triggers the insertion of two more propositional operators: the exhaustive operator *EXH* and the universal propositional operator [ $\forall$ ] (Kratzer & Shimoyama 2002; Menéndez-Benito 2005; Aloni 2007; Rawlins 2013); see (9a). The former functions similarly to a covert ‘only’ attached to the *wh*-word. It strengthens the meaning of a question from a set of propositions to a set of mutually exclusive propositions; (9b). The latter is applied after the whole (un)conditional structure is composed; (9c). It takes a set of propositions (more precisely, a set of conditionals) as its input and returns the proposition that all members of the set are true; (9d).

- (9) Whatever Dan cooked, Sue was happy.
- a.  $[\forall] [\text{MOD} [\text{FOCP } Q_i \text{ EXH}_j \text{ Dan cooked } [\text{FOC}_i \text{ what}] \text{ ever}_j] [\text{Sue was happy}]]$
  - b.  $[[[\text{FOCP } Q_i \text{ EXH}_j \text{ Dan cooked } [\text{FOC}_i \text{ what}] \text{ ever}_j]]^g]$   
 $= \{p : \exists x[p = \lambda w[\text{EXH}_x(\text{COOKED}_w(\text{DAN}, x))]]\}$
  - c.  $[[\text{MOD} [\text{FOCP } Q_i \text{ EXH}_j \text{ Dan cooked } [\text{FOC}_i \text{ what}] \text{ ever}_j] [\text{Sue was happy}]]^g]$   
 $= \{p : \exists x[p = \lambda w\forall w' \in \text{ACC}_w[\text{EXH}_x(\text{COOKED}_{w'}(\text{DAN}, x)) \rightarrow \text{HAPPY}_{w'}(\text{SUE})]]\}$
  - d.  $[[[\forall][\text{MOD} [\text{FOCP } Q_i \text{ EXH}_j \text{ Dan cooked } [\text{FOC}_i \text{ what}] \text{ ever}_j] [\text{Sue was happy}]]^g]$   
 $= \lambda w_0\forall p' \in \{p : \exists x[p = \lambda w\forall w' \in \text{ACC}_w[\text{EXH}_x(\text{COOKED}_{w'}(\text{DAN}, x)) \rightarrow \text{HAPPY}_{w'}(\text{SUE})]]\} :$   
 $p'(w_0) = 1$
- (where  $\text{EXH}_x(\phi[x]) = \phi[x] \wedge \forall y[\phi[y] \rightarrow x = y]$ )

While the syntax-semantics of unconditionals may seem fairly complex, it is important to keep in mind that the semantics of the *wh*-clause remains identical to what we have seen for *wh*-interrogative.

### 3.3 Correlatives

Like unconditionals, I treat correlatives as a subtype of conditionals, in which the correlative clause corresponds to the antecedent (Andrews 1975; Bittner 2001; Brasoveanu 2008, 2012; Liu 2016; Demirok 2017a).<sup>11</sup> I argue that the *wh*-words in correlatives lexicalize a larger feature structure than in interrogatives or unconditionals, namely [top+foc] – TOP for short. TOP triggers the insertion of a specialized correlative operator – *Cor* – in the left periphery of the conditional-like structure; see (10a). The semantics of the correlative antecedent is indistinguishable from the semantics of an interrogative: it denotes an open proposition; (10a). The difference steps in with the *Cor*-operator, which plays two roles, it functions as a connector between the correlative antecedent and consequent, creating standard conditional semantics, and at the same time searches for a coindexed topical phrase (the *wh*-phrase), which it semantically binds. This is a *semantic topic* in the sense that it is semantically specified to be talked about (referentially picked up) in the second argument of *Cor* – the consequent of the correlative structure; (10c). In other words, the antecedent raises a topic (the *wh*-word), the consequent reintroduces it in the form of a pronoun (typically a demonstrative) and comments on it; (10d).<sup>12</sup>

<sup>10</sup>For a recent alternative, where the *wh*-word is not treated as an interrogative, but rather as a quantificational indefinite, see Szabolcsi (2019) and Fălăuș & Nicolae (2022).

<sup>11</sup>This is in conflict with another popular view, which treats correlatives on a par with (free) relative clauses (see, e.g., Srivastav 1991a; Bhatt 2003; Lipták 2004). The evidence put forth in this chapter supports the conditional-based analysis.

<sup>12</sup>Correlatives come in different flavors, from generic, which are most common cross- and intra-linguistically, to definite, which report something about a single referent. I assume that this distinction can be modeled by (i) the type of accessibility relation contributed by *Cor* and (ii) the operator that *Cor* introduces (universal vs. existential/definite).

- (10) Was Dan gekocht hat, das hat Susi gegessen.  
 what Dan cooked has that has Susi eaten  
 ‘Susi ate what Dan cooked.’
- a.  $[\text{TOP}_i \text{ Cor}_i [\text{Dan cooked } [\text{TOP}_i \text{ what}]] [\text{Susi ate that}_i]]$
- b.  $[[\text{Dan cooks } [\text{TOP}_i \text{ what}]]^g$   
 $= \lambda w [\text{THING}_w(g(i)) \wedge \text{COOKED}_w(\text{DAVE}, g(i))]$
- c.  $[[\text{Cor}_i \phi \psi]^g = \lambda w \forall w', x [[w' \in \text{ACC}_w \wedge [\phi]^g[i \rightarrow x](w')] \rightarrow [\psi]^g[i \rightarrow x](w')]$
- d.  $[[[\text{TOP}_i \text{ Cor}_i [\text{Dan cooks } [\text{TOP}_i \text{ what}]] [\text{Susi eats that}_i]]]^g$   
 $= \lambda w \forall w', x [[w' \in \text{ACC}_w \wedge \text{THING}_{w'}(x) \wedge \text{COOKED}_{w'}(\text{DAVE}, x)] \rightarrow \text{ATE}_{w'}(\text{SUE}, x)]$

The semantic specification of Cor models the fact that correlative constructions must involve a coreference/binding between a wh-word in the antecedent and a demonstrative (or pronominal) in the consequent; cf. (11). In this context it is good to point out that not all languages distinguish morphologically between unconditionals and correlatives. In Turkish or Kiksht, for instance, a structure like (11) would be grammatical and would receive the intended unconditional meaning (Demirok 2017a; Duncan 2022). In German, however, the unconditional meaning must be explicitly encoded by particles (*auch immer*) that indicate the presence of the appropriate unconditional operators.

- (11) \*Was Dan gekocht hat, Susi war froh.  
 what Dan cooked has Susi was happy  
 Intended: ‘Whatever Dan cooked, Susi was happy.’

### 3.4 Free relatives

Free relatives, as well as the other relative clause types discussed below, are different from interrogatives, unconditionals, and correlatives in one crucial respect: while the latter types of constructions can be analyzed using propositional semantics, (free) relatives necessarily involve a semantic shift from a proposition to a property of entities (Caponigro 2003; Chierchia & Caponigro 2013; Šimik 2021; cf. Hall & Caponigro 2011; Bücking 2021 on FRs introduced by adverbial wh-words). Since free relatives are typically used as arguments or adjuncts (rather than predicates), they are subsequently shifted to an entity, more specifically the maximal entity that with the property expressed by the free relative – a process considered to be a default among the type-shifts (Dayal 2004).<sup>13</sup>

I argue that the [rel] feature, or more precisely the REL feature structure is involved in the above-mentioned property shift. There are empirical reasons (see section 5) to assume that the effect of REL must be local, i.e., the wh-word must move and trigger the property shift at the level where the proposition is completed – RelP; (12a).<sup>14</sup> The Rel head is semantically vacuous, it only serves to attract the wh-word to its specifier. The index contributed by REL percolates to the wh-phrase level and triggers lambda abstraction over a variable restricted by the descriptive contents of the wh-phrase (cf. Heim & Kratzer 1998; Caponigro 2003; Adger & Ramchand 2005); (12b)/(12c). The resulting property is then shifted to the maximal plural entity satisfying the description (modeled here as an individual concept), (12d), which in turn can be distributed as a referential NP. In our example, it is the internal argument of *ate*, giving the result in (12e).

<sup>13</sup>There is a growing body of literature showing that free relatives in some languages can also retain the property-type semantics and become arguments to existential predicates, giving rise to so-called existential or indefinite free relatives. This is a productive construction type esp. in American languages; see Kotek & Erlewine (2016); Polian & Aissen (2021); Duncan (2022). Property-type wh-clauses are arguably also involved in modal existential constructions; see Šimik (2011). Another subtype of free relatives that I set aside here are the so-called transparent free relatives; for recent discussion see Grosu (2016).

<sup>14</sup>Alternatively, the [rel] feature is base-generated in the left-periphery and combines with the wh-word only after movement (by an operation called undermerge by Pesetsky 2007; see also Sportiche 2005; Wiland 2009; Kondrashova & Šimik 2013). This alternative is in a good position of deriving the “no relative wh-in-situ” generalization (see section 5), but also faces theoretical and empirical challenges.

(12) Sue ate what Dan cooked.

- a. Sue ate  $[\text{RelP } [\text{REL}_i \text{ what}]_i \text{ Rel } [\text{Dan cooked } t_i]]$
- b.  $[[[\text{REL}_i \text{ what}]_i \phi]]^g = \lambda w \lambda x [\text{THING}_w(x) \wedge [[\phi]]^g[i \rightarrow x]]$
- c.  $[[[\text{RelP } [\text{REL}_i \text{ what}]_i \text{ Rel } [\text{Dan cooked } t_i]]]^g]$   
 $= \lambda w \lambda x [\text{THING}_w(x) \wedge \text{COOKED}_w(\text{DAN}, x)]$
- d.  $[[\text{MAX}[\text{RelP } [\text{REL}_i \text{ what}]_i \text{ Rel } [\text{Dan cooked } t_i]]]^g]$   
 $= \lambda w \sigma x [\text{THING}_w(x) \wedge \text{COOKED}_w(\text{DAN}, x)]$
- e.  $[[\text{Sue ate MAX}[\text{RelP } [\text{REL}_i \text{ what}]_i \text{ Rel } [\text{Dan cooked } t_i]]]^g]$   
 $= \lambda w [\text{ATE}_w(\text{SUE}, \sigma x [\text{THING}_w(x) \wedge \text{COOKED}_w(\text{DAN}, x)])]$

Free relatives typically exist in two main types – so-called plain free relatives, described above, and ever free relatives, which involve the ever-morpheme, also used in unconditionals (see section 3.2). An ever free relative counterpart of the example just discussed is in (13).

(13) Sue ate whatever Dan cooked.

The presence of the ever-morpheme has non-trivial consequences for both semantics (Dayal 1997; von Stechow 2000; Tredinnick 2005; Abenina-Adar 2019; Šimik 2021) and syntax (Donati & Cecchetto 2011; van Riemsdijk 2017; Caponigro 2019, advance publication; Donati et al. 2022). Their analysis has been subject to ongoing controversy. The traditional assumption that they are simply a subtype of free relatives (Dayal 1997; Caponigro 2003; a.o.) has recently been challenged by an analysis in which they are closer to headed relatives (Donati & Cecchetto 2011; Donati et al. 2022), but also an analysis in which they are akin to unconditionals (and hence wh-interrogatives; Hirsch 2016; Šimik 2018). The multi-faceted evidence discussed in this chapter supports the position that they indeed share properties with unconditionals/wh-interrogatives. I skip an analysis of ever free relatives at this point (see esp. Šimik 2018 for an analysis consistent with the overall constellation assumed here), for reasons of space, but will come back to it briefly when discussing Tsez free relatives (section 5).

### 3.5 Light-headed relatives

Light-headed relatives are sometimes analyzed on a par with (plain) free relatives and together with them can be referred to as headless relatives (implying relatives lacking an overt *nominal* head; Lehmann 1984; Caponigro et al. 2021), a convention adopted here, too.<sup>15</sup> Light-headed relatives differ from free relatives in that they are headed by a pronoun (aka a light head), typically a demonstrative (‘that (one)’), indefinite (‘something’, ‘nothing’), or universal (‘everything’). They can be analyzed as property-denoting free relatives selected by a semantic determiner (formally a pronoun), which functions as an overt type-shifter (cf. the covert MAX operator in (12d)). The range of shifts is broader than in free relatives and correlates with the semantics of the light heads. In (14), for instance, the light head is a quantificational determiner, which means that it turns the whole complex DP into a quantifier; (14b). I assume that the wh-word used in light-headed relatives has the same featural make-up as the one used in free relatives. This seems to align with the empirical facts in that the wh-words used in light-headed and free relatives are typically identical, i.e., the same set of wh-words is used and they have the same morphological shape (see Šimik 2021 and section 2).<sup>16</sup>

<sup>15</sup>There is a good deal of terminological confusion. “Headless relatives” are sometimes intended to refer to what is called here free relatives (e.g. Citko 2004) and “free relatives” are sometimes intended to refer to what is called here headless relatives (e.g. Flynn & Foley 2004). The term light-headed relatives (headless, but non-free relatives) is due to Citko (2004).

<sup>16</sup>English constitutes a notable exception to this generalization because its light-headed relatives are introduced by wh-words typical of (nominally) headed relatives (or by a complementizer): *something which/that/\*what they enjoy*. A plausible analysis would involve a covert nominal head in the structure of the light-headed relatives; see Cinque (2020) for relevant discussion.

- (14) Susi hat alles gegessen, was Dan gekocht hat.  
 Susi has everything eaten what Dan cooked has  
 ‘Susi ate everything that Dan cooked.’
- a. Susi ate  $[_{DP} \text{everything } [_{RelP} [_{REL_i} \text{what}]_i \text{Rel } [\text{Dan cooked } t_i]]]$
  - b.  $[[[_{DP} \text{everything } [_{RelP} [_{REL_i} \text{what}]_i \text{Rel } [\text{Dan cooked } t_i]]]]^g$   
 $= [[\text{everything}]^g (\lambda w \lambda x [\text{THING}_w(x) \wedge \text{COOKED}_w(\text{DAN}, x)]]$   
 $= \lambda P \lambda w \forall x [\text{THING}_w(x) \wedge \text{COOKED}_w(\text{DAN}, x) \rightarrow P_w(x)]$
  - c.  $[[\text{Susi ate } [_{DP} \text{everything } [_{RelP} [_{REL_i} \text{what}]_i \text{Rel } [\text{Dan cooked } t_i]]]]^g$   
 $= \lambda w \forall x [\text{THING}_w(x) \wedge \text{COOKED}_w(\text{DAN}, x) \rightarrow \text{ATE}_w(\text{SUSI}, x)]$

### 3.6 Headed relatives

Headed relatives are by far the best-studied, but also the most complex subtype of relative clauses. I do not intend to do justice to the various formal and semantic types of headed relatives (see Cinque 2020 for a recent comprehensive analysis) and will only deal with the prototypical postnominal restrictive finite relative clause, typical for languages in which wh-based headed relatives exist. Headed relatives differ from light-headed (or free) relatives in that before they become restrictors of a (quantificational) determiner, they intersect with a nominal head. I argue that the [mod] feature on wh-words enters into agreement with an operator, similar to Chung & Ladusaw’s (2006) Modify. This operator conceived of as the head of ModP – a high projection in the left periphery of headed relatives. Mod, just like the rule of predicate modification, conjoins its two arguments; (15b). Within the relative clause, the wh-word moves, the index on REL percolates to the whole fronted wh-phrase and triggers lambda abstraction; (15c). The index of the [mod] feature is purely formal (i.e., it corresponds to an uninterpretable feature) and triggers the insertion of Mod. After Mod takes the relative clause and the nominal head as its argument, (15d), the resulting property restricts a determiner and the whole DP is used, for instance, as an argument; (15e).<sup>17</sup>

- (15) Sue ate the meal which Dan cooked.
- a. Sue ate  $[_{DP} \text{the } [_{ModP} [_{NP} \text{meal}] \text{Mod}_j [_{RelP} [[\text{mod}_j \text{REL}_i] \text{which}]]_i \text{Rel } [\text{Dan cooked } t_i]]]]]$
  - b.  $[[\text{Mod}]^g = \lambda P \lambda Q \lambda w \lambda x [Q_w(x) \wedge P_w(x)]$
  - c.  $[[[_{RelP} [[\text{mod}_j \text{REL}_i] \text{which}]]_i \text{Rel } [\text{Dan cooked } t_i]]]^g$   
 $= \lambda w \lambda x [\text{THING}_w(x) \wedge \text{COOKED}_w(\text{DAN}, x)]$
  - d.  $[[[_{ModP} [_{NP} \text{meal}] \text{Mod}_j [_{RelP} [[\text{mod}_j \text{REL}_i] \text{which}]]_i \text{Rel } [\text{Dan cooked } t_i]]]]^g$   
 $= \lambda w \lambda x [\text{MEAL}_w(x) \wedge \text{COOKED}_w(\text{DAN}, x)]$
  - e.  $[(15a)]^g = \lambda w [\text{ATE}_w(\text{SUE}, \iota x [\text{MEAL}_w(x) \wedge \text{COOKED}_w(\text{DAN}, x)]]$

### 3.7 Summary

I have provided simplified analyses of the wh-constructions under discussion. In these analyses, the syntactic and semantic complexity of the wh-words and the corresponding wh-constructions grows incrementally. The “smallest” interrogative (FOC-marked) wh-word denotes a restricted variable bound by a Q-operator and is used in wh-interrogatives and unconditionals. In correlatives, the variable becomes topical (TOP-marked), introducing referents to be commented on. This is a semantic process and as such it is mediated by a specialized semantic operator which binds the variable and the demonstrative/pronominal correlate in the commenting consequent clause. What interrogatives, unconditionals, and correlatives all have in common is that they can be (and are, in the above analyses) represented

<sup>17</sup>I use the so-called head external analysis for the sake of illustration. A more complete analysis would make use of the so-called matching or raising structure. For recent discussion, mostly in favor of matching, see Pankau (2018); Salzmann (2019); Cinque (2020).

as propositions and do not necessarily require a shift to properties. They receive a natural treatment with *wh-in-situ* syntax–semantics, but are compatible with *wh-ex-situ* as well. In relative clauses, the *wh*-word carries REL ([rel+top+foc]), which contributes an index that functions as a lambda-abstractor, deriving a property from a proposition. As such, it can only be interpreted in the left periphery and hence requires movement. This movement is triggered by the Rel head. In free relatives, the property is shifted to the maximal plural entity with that property, a process considered the default among lowering operations. In light-headed relatives, the property is shifted by an overt pronoun/determiner. Finally, headed relatives build on the property derived by the *wh*-movement, but contribute an additional feature, called [mod], which requires the relative clause to become a semantic modifier of a nominal head.

The analyses assumed above, or some alternative formal implementations thereof, have been argued for independently. In what follows, I put forth evidence supporting this incremental treatment of the *wh*-constructions under discussion. The evidence complements the morphological one provided in section 2. In section 4 I show that the cross-linguistic availability of *wh*-words in the individual constructions aligns with the *wh*-hierarchy: *Wh*-words are most likely to be used in *wh*-interrogatives and unconditionals and least likely to be used in headed relatives. Section 5 considers two types of syntactic evidence. First, it discusses and defends the robust generalization that there is no *wh-in-situ* in relative clauses. The generalization is modeled by the assumption that the use of *wh*-words as relative operators requires overt *wh*-movement. Second, it shows that the higher a *wh*-construction is on the *wh*-hierarchy, the higher the *wh*-word moves in that construction (if it moves). The brief section 6 complements the typological and grammatical evidence by evidence from diachrony and L1-acquisition.

## 4 Cross-linguistic distribution of *wh*-constructions

Having an inventory of interrogative pronouns could be a reasonable candidate for an absolute universal, if it were not for the Caucasian language Abaza, which is claimed to construct *wh*-interrogatives by the use of verbal affixes rather than pronouns (Arkadiev 2020). (I will briefly return to Abaza below.) Nevertheless, it is common for a language to have a class of interrogative pronouns, which can be defined as pronouns that indicate the locus of ignorance in root *wh*-interrogatives. Most languages can use the same pronouns in embedded *wh*-interrogatives, even though there are languages where this strategy alternates with a non-*wh* relative clause-based strategy (see the discussion around (7) above). The use of interrogative pronouns, or simply *wh*-words, for other than interrogative functions is typologically not very common, to the extent that it is sometimes considered a property of “Standard Average European” (Haspelmath 1998; Comrie 1998).<sup>18</sup> More specifically, the availability of *wh*-words in relative clauses is assumed to be a property characterized not so much by genealogical affinity, but by a geographical area – the area of Europe and adjacent regions – mostly including languages from the Indo-European, Uralic, and Semitic families. Today we know that *wh*-words are productively used for relative functions also in Mesoamerican and North American languages (see esp. Caponigro et al. 2021). It remains unclear to what extent it is due to contact with European languages. I am aware of two languages in which *wh*-words are used in relative clauses and where language contact can hardly be at stake, namely the Yam (Papuan) languages Komnzo (Döhler 2018) and Nama (Siegel 2019).<sup>19</sup>

Despite the relatively limited cross-linguistic distribution of non-interrogative *wh*-constructions, it appears that their availability is constrained in a non-trivial way along the lines of the implicational universal in (16). A part of this universal, namely that *wh*-words are used in headed relatives only if they are also used in headless relatives, cf. (16a), was previously formulated by Lehmann (1984: 326). The sub-universal in (16b) would merit more investigation. The reason is that correlatives or unconditionals are often omitted in grammatical descriptions.

<sup>18</sup>I set aside *wh*-words as bases of indefinites (briefly hinted at in section 1), which are very common, arguably because they are mostly derived directly from interrogatives (see Haspelmath 1997; Haida 2007; Hengeveld et al. early access; a.o.).

<sup>19</sup>Christian Döhler (p.c.) reports that this is a more general property of at least two of the three subgroups of the Yam languages and that it may in fact be an areal phenomenon in southern New Guinea.

(16) **Cross-linguistic distribution of wh-constructions**

If a language uses wh-words for some function in the wh-hierarchy (3), it also uses wh-words for constructions that are lower in the hierarchy, but not necessarily conversely.

- a. If a language uses wh-words for headed relatives, it also uses them for headless relatives, correlatives/(un)conditionals, and interrogatives.
- b. If a language uses wh-words for headless relatives, it also uses them for correlatives/(un)conditionals, and interrogatives.
- c. If a language uses wh-words for correlatives/(un)conditionals, it also uses them for interrogatives.

The generalization is illustrated on a genealogically diverse sample of languages in Table 3.

Language	Wh-words used in				Source
	I	UnC/CoR	–HR	HR	
Abaza	✗	✗	✗	✗	Arkadiev 2020 Arkadiev & Caponigro 2021
Papuan Malay	✓	✗	✗	✗	Kluge 2017
Hausa	✓	✓	✗	✗	Jaggar 2001
Chinese	✓	✓	✗	✗	Luo & Crain 2011; Liu 2016
Japanese	✓	✓	✗	✗	Gawron & Harada 1996; Yagi 2022
Turkish	✓	✓	✗	✗	Demirok 2017a
Haida	✓	✓	✓	✗	Enrico 2003; Cable 2005
Chuj	✓	✓	✓	✗	Kotek & Erlewine 2018
San Pedro Mixtepec Zapotec	✓	?	✓	✗	Antonio-Ramos 2021
Komnzo	✓	✓	✓	✓	Döhler 2018; C. Döhler, p.c.
Czech	✓	✓	✓	✓	Šimík 2008, 2016
Greek	✓	✓	✓	✓	Daskalaki 2020

Table 3: Availability of wh-words across constructions and languages

Without going into analytical details, I suggest that the generalization follows from the incremental featural make-up of wh-words proposed in section 2. If a wh-word (or wh-morpheme) in a language is stored in the lexicon as a tree containing all the features above ([mod+rel+top+foc]), it follows that it can use the wh-words for headed relatives and all the less complex functions as well. If it only stores its wh-words as containing top and foc, for instance, it can only use them for correlatives and interrogatives, but not for more complex functions.

Under this approach to deriving the universal in (16), one could expect that the generalization holds not at the level of languages, but at the level of individual wh-words. This is indeed what we generally seem to find: while some wh-words can be used for a broad range of functions (e.g. the English *where* is used in all the constructions under discussion), others are more restricted (e.g. the English *how*, which cannot be used in headed relatives; cf. Starke 2001).<sup>20</sup>

## 5 Syntax

Two syntactic issues are of immediate concern to us: (i) whether a wh-word moves to the clausal left periphery and, (ii) if it moves, then to which position. I discuss these two issues in turn.

<sup>20</sup>On such a level of granularity, it would be surprising not to find “exceptions”. E.g. the English *who* can be used in headed relatives, but not really in plain free relatives (Patterson & Caponigro 2016). Facts like these indicate that superset-based spellout is not the only limiting factor on which wh-words get attested in which functions.

## 5.1 No relative wh-in-situ

Roughly two-thirds of the languages included in Dryer’s (2013) sample (615 out of 879) are of the wh-in-situ type, i.e., the wh-word in interrogative constructions is located in a position where its non-wh-counterpart would be. Compared to that, the situation in relative clauses is dramatically different. Out of the roughly 50+ languages for which wh-based relative pronouns are attested, there appears to be no single uncontroversial example of relative wh-in-situ. Thus we can formulate (a candidate for) the absolute universal (17).<sup>21</sup>

### (17) No relative wh-in-situ

Relative pronouns (used in free, light-headed, and headed relatives) never appear in situ.

A similar generalization was first noticed by Schwartz (1971) in the context of a discussion of prenominal vs. postnominal headed relatives, but has received little attention in the generative literature.<sup>22</sup> Cecchetto & Donati (2015: 50) briefly discuss the generalization for the case of free relatives and argue that it is explained by their relabeling mechanism, as only a fronted wh-word can relabel a clause to a nominal. It seems, however, that the relabeling analysis does not have a good handle on (light-)headed relatives, which are, arguably, labeled by their (pro)nominal elements rather than the wh-word. The generalization was also recently discussed by Demirok (2017b), with special attention to the contrast between free relatives (where wh-in-situ is non-existent or extremely marginal) and correlatives (where wh-in-situ is possible). Demirok also focuses on one of the potential counterexamples to (17), namely free relatives in Tsez (also discussed below), as described by Polinsky (2015). Demirok’s response to the Tsez facts is to allow for lambda abstraction triggered by covert wh-movement. Once this option is allowed, however, the generalization in (17) remains a mystery; it is unclear why covert wh-movement would not be much more generally available in relative clauses, just as it is – by many linguists’ assumption – in wh-interrogatives.

In light of the generalization (17) and the dubious status of the exceptions discussed below, I hypothesize that (17) is explained by the assumption in (18), which in turn is in line with the conservative analysis of relativization presented in section 3.4–3.6.

### (18) Wh-lambda hypothesis

Wh-movement triggers lambda-abstraction (shifts a proposition into a property) only if it is overt.

Notice that the hypothesis does not entail that all overt wh-movement is for lambda-abstraction purposes. As briefly mentioned above, many alternatives to the so-called operator-movement nature of wh-movement (esp. in wh-interrogatives) have been proposed over the years, including movement for clause-typing (Cheng 1991), for focus-licensing (Sabel 1998; Stepanov 1998), for exhaustive interpretation (Cable 2008; Horvath 2013), or for common prosodic phrasing of the wh-word and the Q-operator (Richards 2010). It also does not entail that there is no covert movement of wh-phrases. As argued by Kotek (2016), for instance, covert wh-movement could be motivated by eschewing intervention effects (similarly as overt movement/scrambling/topicalization in German; cf. Beck 2006; Grohmann 2006). The hypothesis in (18) is also compatible with the movement of *empty* operators, which could in principle be at play in resumption-based relatives (Demirdache 1991) and possibly in internally headed relatives (see Hanink 2021 for recent discussion). Finally, I would not like to rule out the possibility that overt wh-movement in interrogative, unconditional, or correlative constructions can be for lambda-abstraction purposes. Even though I have assumed an open-proposition-based analysis of these constructions (see sections 3.1, 3.2, and 3.3, respectively), it cannot be ruled out that in some languages or constructions the wh-movement is construed as lambda-abstraction and that the path to the meaning leads via properties, just as in relative clauses (see e.g. Xiang 2021 for a recent analysis along these

<sup>21</sup>A common objection concerns internally headed relatives (see Hanink 2021 for a recent discussion). It is important to realize, however, that internally headed relatives never make use of in-situ wh-words.

<sup>22</sup>For relevant typological discussion, see esp. de Vries (2002, 2005).

lines). I would argue, however, that such an analysis (or, taking the processing perspective – parsing) is not the default.

Most languages that use *wh*-words in relative clauses are in accordance with the generalization in (17). I will now concentrate on those which constitute an apparent counterexample to (17), i.e., examples of languages where *wh*-words in relative clauses appear to stay in-situ.<sup>23</sup>

**Tsez** According to Polinsky (2015), Tsez uses *wh*-words for interrogatives, unconditionals, correlatives, and free relatives. Polinsky argues that *wh*-words can be in situ in all these constructions, which is illustrated for the case of free relatives in (19).

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

Wh-in-situ in free relatives is inconsistent with (17) and predicted to be impossible by (18). It is good to note that Polinsky offers a number of solid arguments that Tsez free relatives cannot be reduced to correlatives. There is one alternative which Polinsky does not explicitly consider, however, and that is that the free relatives she discusses are of the ever-type. Notice that (19) is translated using *whoever* (rather than, say, *(the one) who*) and that is the case for most examples discussed.<sup>24</sup> While Tsez also has dedicated morphology for ever free relatives (realized on the *wh*-word and the verb), it is not unseen that languages have multiple strategies of expressing the ever morphology, possibly reflecting the various interpretive facets attested for ever free relatives (see Šimík 2018, 2021 for a cross-linguistic view of the interpretation of ever free relatives). Perhaps the most striking example of that is Telugu, which has three distinct morphemes for three different interpretations of ever free relatives; see Balusu (2017). At the same time, at least one language, namely Turkish, does not have an overt ever morpheme (Demirok 2017a). (This concerns unconditionals, as Turkish has no free relatives, but the issue is analogous.) Why should it be relevant that the *wh*-in-situ free relatives discussed by Polinsky could be ever free relatives in disguise? The reason is that ever free relatives share properties with unconditionals. According to Hirsch (2016) and Šimík (2018), ever free relatives are represented at LF by two *wh*-clauses: an unconditional (which is akin to a *wh*-interrogative; see section 3.2) and a donkey-anaphoric free relative. As I argued in Šimík (2018), the analysis gives rise to the expectation that ever free relatives exhibit a mixture of properties of free relatives on the one hand and unconditionals/interrogatives on the other. One property that ever free relatives share with unconditionals/*wh*-interrogatives is that they generally allow for the use of complex *wh*-phrases such as 'which book' (see Cecchetto & Donati 2015 and Caponigro 2019 for discussion). Another one is that ever free relatives (in Czech) do not license the use of epistemic modals. As it appears, Tsez free relatives generally make use of the interrogative form of the verb; see (19). This and – I would argue – the possibility of *wh*-in-situ might well be properties which reflect the unconditional/*wh*-interrogative facet of ever free relatives. Exploring the predictions of this re-analysis of Tsez free relatives is left for another occasion.

Before I move on, I would like to mention one more property of Tsez free relatives, which bears relevance to the issue at stake. While *wh*-words in Tsez free relatives clearly do not have to be clause-initial, it also holds that they cannot be postverbal, which is a position available to their non-*wh*-counterparts. One could therefore explore the hypothesis that the *wh*-word moves, after all. Movement to non-initial positions is indeed attested in relative clauses in other languages, as will be discussed

<sup>23</sup>Bambara is sometimes cited as a counterexample (see, e.g., de Vries 2005). However, according to the Mande expert Valentin Vydrin (p.c.), the Bambara relativizer *min* is not a *wh*/relative-pronoun at all.

<sup>24</sup>The only exception is example (i), in which the *wh*-word is not initial, but it is preceded by a single pronominal constituent, a situation that is reminiscent of what happens in some other languages (see below).

- (i) [Debe-r (šebi)        y-eti-xo(-si)]    mi-tow    yoɫ.  
       2SG-LAT who.ABS.(II) II-like-PRS-ATTR 2SG.ABS-FOC be.PRS  
       'Who you really like is yourself.'



below.<sup>25</sup>

**Hittite, Komnzo** Hittite potentially poses an even greater challenge than Tsez to the generalization in (17). The reason is that it appears to have *wh*-in-situ even in headed relatives (Hoffner & Melchert 2008; Huggard 2011, 2015), for which there is little chance of being related to *wh*-interrogatives in a way that ever free relatives are. Consider example (20) (from Huggard 2015: 160), in which the relative *wh*-word is preceded by its own predicate within the relative clause.

- (20)  $\text{LÚ}_K\text{AŠ}_4\text{.E}$  [ $_{\text{HR}}$  [(taruḫzi kui)]š ] 2  $\text{NINDA}$ wagataš 1 MA[NA KÙBABBAR]  
runner.NOM.SG win.NPST.3SG who.NOM.SG 2 wagada.bread.ACC.SG 1 mina silver  
LUGALwaš [(kiššaraz=š)]et dāi.  
king.GEN.SG head.ABL.SG=his take.NPST.3SG  
'The runner who wins takes two wagada-breads and one mina of silver from the hand of the King.'

As argued by Huggard (2015), *wh*-words in relative clauses of the “determinate” type are in fact clitics. The position of the relative *wh*-word *kuiš* ‘who’ in (20) can thus be explained by a postsyntactic cliticization process.<sup>26</sup> Whether Hittite allows for genuine *wh*-in-situ in headed relatives is a complex and controversial issue. While Huggard (2015) argued that it does, Lyutikova & Sideltsev (online first) argue, based on extensive corpus evidence, that relative *wh*-words always move to the left periphery, although not always to the initial position.

Although not described in terms of prosody, the data pattern reported by Döhler (2018) for Komnzo relative clauses is similar to the one of Hittite. Relative pronouns often appear in the second position within the relative clause. Nevertheless, this position is not an in-situ position, as reported by Christian Döhler (p.c.): while *wh*-words in interrogatives are positioned relatively freely and can be genuinely in situ (in the position of the non-*wh* counterpart), relative *wh*-words are always either initial or in the second position (more commonly so, in fact). This is illustrated by the contrast between (21a), an embedded interrogative clause, and (21b), a headed relative clause (from Döhler 2018: 328, 108, respectively).

- (21) a. be fam kwot [ $_{\text{HR}}$  kararé tosin mafan kwa  
2SG.ERG thought properly 2SG:SBJ:IMP:IPFV.do torch who.SG.DAT FUT  
yarithr ].  
2|3SG:SBJ>3SG.MASC:IO:NPST:IPFV.give  
'You have to think properly to whom you will give the torch.'
- b. dödö [ $_{\text{HR}}$  mane=me ḡarenwre fath ]  
dödö which=INS 1PL:SBJ:NPST:IPFV.sweep clearing  
'that dödö with which we sweep the place'

**Hindi** While the primary relativization strategy in Hindi is correlativization (Srivastav 1991b; Dayal 1996; Bhatt 2003; Brasoveanu 2012), headed relatives are also available in this language. And it has been reported that the *wh*-in-situ observed in Hindi correlatives is also an option for Hindi headed relatives (Lehmann 1984; Mahajan 2000; de Vries 2005). This is illustrated in (22a) (from Mahajan 2000: 204). Nevertheless, as claimed by Lehmann (1984), *wh*-in-situ is only available in *appositive* (i.e., not restrictive) headed relatives. This is illustrated by example (22b) (from Rajesh Bhatt, p.c.), which shows that *wh*-in-situ cannot appear in a relative clause headed by a negative polarity determiner, making the whole complex NP non-referential, which in turn is something impossible for NPs modified by appositive relatives. Why should the contrast between appositive and restrictive relatives be relevant in this context? Only restrictive relatives necessarily involve lambda-abstraction, followed by intersection

<sup>25</sup>See Borise (ahead of print) for a recent argument that the preverbal position of *wh*-phrases in Georgian (an areal kin of Tsez) is derived by A-bar movement.

<sup>26</sup>An analogous analysis might apply to some texts in Ancient Greek; see Bertrand (2023).

with the nominal head. In appositive relatives, the *wh*-word can be represented as a variable coindexed with the (necessarily referential) relative clause head; in other words, an appositive relative clause can be treated as a proposition rather than a property (see, e.g., Del Gobbo 2003), which in turn renders *wh*-movement for purposes of lambda abstraction unnecessary.

- (22) a. mujhe vo aadmii [Siitaa -ko jo acc<sup>h</sup>aa lagtaa] he pasand nahii he  
 I.DAT DEM man Sita -DEM REL nice seem.IMP be.PRES like NEG be  
 ‘I don’t like the man, who Sitea likes.’  
 b. #ek-bhii kitaab [Ram-ne jis-kii taariif kii thii] Mina-ne mujhe nahiiN dikhaayii  
 one-even book Ram-ERG REL-GEN praise do be Mina-ERG me.DAT NEG show  
 Intended: ‘Mina didn’t show me any book that Ram had praised.’

**Udmurt, Latin** We have seen that Komnzo relative *wh*-pronouns can appear in the second position of the relative clause. Something similar has been reported for other languages, too, such as Udmurt and Latin.<sup>27</sup> An example from Udmurt is in (23) (from Dékány et al. 2020: 30) and one from Latin is in (24) (from Bianchi 2000: 72). For both these languages, it is claimed the availability of pre-relative pronoun material is related to the richness of left peripheral syntax, which in turn is related to information structural manipulations (cf. Rizzi 1997). What is important is that the relative pronoun is clearly *ex-situ*, as predicted by (18).

- (23) Pijaš [Ižkaryšen kudinyz tynad adžiškono] kotčyšjosty jarate.  
 boy Izhevsk.EGR which.INS/COM 2SG.GEN see.PTCP cat.PL.ACC like.3SG  
 ‘The boy whom you have to meet in Izhevsk likes cats.’  
 (24) coluber mala gramina pastus, frigida sub terra tumidum quem bruma tegebat  
 snake.NOM bad plants fed.with cold under earth tumid.ACC which.ACC winter kept  
 ‘the snake fed with bad plants which the winter kept tumid under the cold earth’  
 (from Vergilius: *Aeneid II*, 471–472)

I know of no compositional semantic analysis of relative pronouns fronted to a non-initial position within the relative clause. It appears that the constituent preceding the relative pronoun would have to “intervene” between the structure introduced by the relative pronoun and the NP head. However, as correctly pointed out by an anonymous reviewer to me, the intervening constituent would do no harm as long as it is not a generalized quantifier. The movement of any other type of constituent to a position in front of the relative pronoun could easily be modelled as semantically vacuous, leaving the property denotation triggered by the relative pronoun intact.

## 5.2 Landing site of *wh*-movement

The generalization that I am concerned with in this subsection is that the height of *wh*-movement landing site tends to correlate with the complexity of the *wh*-expression involved. In other words, *wh*-movement in interrogatives tends to target positions that are lower than *wh*-movement in relative clauses.

### (25) Landing site of *wh*-movement

Given a language *L*, construction *C*, and a landing site *S* such that *wh*-movement targets *S* in *C* in *L*, the *wh*-movement of a *wh*-word which is higher on the hierarchy than the one in *C* targets a landing site which is at least as high as *S* in *L*.

(where height is understood in terms of asymmetric *c*-command)

I would argue that the generalization follows from the incremental growth of the *wh*-word, which is matched by the incremental growth in the clause structure. If a language exhibits *wh*-movement in the

<sup>27</sup>Colloquial Russian is claimed to allow for this too; see Dékány et al. (2020: 31).

wh-constructions under consideration, it comes as no surprise that the wh-movement targets a position close to the operator that the wh-word is syntactically and semantically associated with.<sup>28</sup>

A well-known and straightforward representative of the generalization in (25) is Hungarian, in which interrogative wh-words target a position which is structurally lower than the corresponding wh-words in relative clauses, as illustrated in (26) (from Kenesei 1994: 298).

- (26) a. Nem tudja hogy Péter tegnap kit látott.  
 NEG know.3SG COMP Peter yesterday who.ACC saw.3SG  
 ‘He doesn’t know who Peter saw yesterday.’
- b. a tanú (\*hogy) aki (\*hogy) Pétert tegnap látta  
 the witness COMP REL.who COMP Peter.ACC yesterday saw.3SG  
 ‘the witness who saw Peter yesterday’

In line with (25), wh-words in unconditionals and correlatives can marginally be preceded by topicalized constituents; see (27a) (from Kenesei 1994: 304) and (27b) (from É. Kiss 2002: 244).

- (27) a. Pétert aki látta, szóljon.  
 Peter.ACC REL.who saw.3SG speak.IMP  
 ‘Whoever saw Peter, (please) speak up.’
- b. Másnak aki vermet ás, maga esik bele.  
 other.DAT REL.who pit.ACC digs himself falls in.it  
 ‘Who digs a pit for someone else, falls in it himself.’

Comparable observations have been made for Italian. In (28), for instance (from Benincà 2001; Bertollo & Cavallo 2012), it is shown that interrogative wh-words can be preceded by topics, but relative wh-words – whether free relative or headed relative – cannot.

- (28) a. Con Mario, di che cosa volevi parlare?  
 with Mario about what wanted talk  
 ‘What did you want to talk about with Mario?’
- b. Ho incontrato {chi di pane / \*di pane chi} ne mangia molto.  
 have.1SG met who of bread of bread who it eats much  
 ‘I have met (those people) who eat(s) a lot of bread.’
- c. il ragazzo a cui il libro lo porterò domani  
 the boy to whom the book it bring tomorrow  
 ‘the boy to whom I’ll bring the book tomorrow’

It is also possible to find an asymmetry in the expected direction between headed relatives and free relatives. In Slovenian, for instance, the complementizer *da* can surface in headed relatives, but not in the corresponding free relatives. If the complementizer is [mod]-related (see section 3.6), it follows that it cannot surface in free relatives, which only involve the [rel]-feature (see section 3.4). The data in (29) build on Hladnik (2015) and are complemented by data from Marko Hladnik (p.c.).

- (29) a. Živi v pokrajini, kjer (da) imajo najboljšo vino.  
 lives in region where.REL COMP have best wine  
 ‘He lives in a region where (it is claimed) they have the best wine.’
- b. Živi, kjer (\*da) imajo najboljšo vino.  
 lives where.REL COMP have best wine  
 (Intended:) ‘He lives where (it is claimed) they have the best wine.’

<sup>28</sup>This could either be modeled in terms of the Spec-Head / upward Agree relation (Bjorkman & Zeijlstra 2019) or in terms of Richards 2010’ (2010) prosodic requirement.

## 6 Diachrony and acquisition

The wh-hierarchy (3) also receives support from diachrony and L1-acquisition. Both types of evidence clearly point to the primacy of wh-interrogatives and the derived nature of relatives (whether headless or headed). Where correlativization is at stake, it arguably represents an intermediate step between wh-interrogatives and relatives. There is also evidence that headless relatives are developmental precursors of headed relatives. Assuming the analysis presented in section 3, the diachronic or acquisition-related development corresponds to the incremental addition of new functions/features to the already developed/acquired ones. This in turn is in line with Friedmann et al.'s (2021) growing trees hypothesis.

**Diachronic evidence** While some authors propose that wh-based relative clauses have developed directly from embedded wh-interrogatives (see Heine & Kuteva 2006; Bacskai-Atkari & Dékány 2021), there is also evidence for a more fine-grained diachronic path. First, Belyaev & Haug (2020) argue that wh-based correlatives have developed from conditionals with antecedents containing wh-based indefinites. Their analysis of (un)conditionals and correlatives is compatible with the approach sketched in 3.2 and 3.3: the wh-words in these structures are treated as indeterminate/Hamblin pronouns (Ramchand 1997; Kratzer & Shimoyama 2017), which can be considered as a technical variant of the variable-based approach assumed here.<sup>29</sup> Belyaev & Haug support their claim by showing that correlatives with a universal reading are diachronic precursors of correlatives with a definite reading. The argument relies on the assumption that the universal reading can be more directly derived from interrogative semantics, which involves a set of alternatives, which in turn lend themselves to being universally quantified, much like what is standardly assumed for unconditionals (see section 3.2).

Moving one step up the hierarchy, I note that it is a relatively broadly accepted idea that (light-)headed relatives in contemporary Indo-European languages have developed from the corresponding correlatives (Urbańczyk 1935; Bauer 1960; Haudry 1973; Lehmann 1984; Kiparsky 1995; Mitrenina 2012; Meyer 2017; for suggestive but differently interpreted evidence see Gisborne & Truswell 2020; for a dissenting view see Probert 2015). The idea is that the originally left-adjoined correlative clause is used as the restrictor of the donkey-anaphoric (E-type) definite (typically demonstrative) determiner within the consequent. I note that this is only possible if the correlative clause is (re)analyzed as property-denoting (in order to be able to act as a restrictor), which, according to hypothesis (18), is only possible if there is overt wh-movement. Notice that overt wh-movement in correlatives does not have to be motivated by lambda-abstraction; it can start out as a discourse-related movement, for instance, which later gets reanalyzed as lambda-abstraction.

As far as free relatives are concerned, they either might have developed from correlatives or – via ever free relatives – from unconditionals. The path from unconditionals to ever free relatives received some support for Spanish and Dutch in Aguilar-Guevara et al. (2011) (also see the references cited therein).

I am not aware of any research suggesting that there would be a diachronic shift from headless (free or light-headed) to headed relatives.

**Evidence from acquisition** There is ample evidence that wh-interrogatives are the first wh-constructions to be acquired. They are usually mastered before or around the age of two (Brown 1968; Thornton 2016). What follows – generally by the age of two-and-half – is the acquisition of temporal and conditional clauses (often introduced by the wh-word for ‘when’); see Clancy et al. (1976); Reilly (1982, 1986); Katis (1997). Conditionals and possibly more generally adverbial clauses are arguably closely related to correlatives and free relatives. As for argumental free relatives (introduced, for instance, by ‘what’), they are acquired earlier than the corresponding headed relatives, in particular some time between two-and-half and three, a phenomenon called the “developmental primacy of free rela-

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<sup>29</sup>Belyaev & Haug (2020) do not discuss unconditionals explicitly, but they can be considered as a subtype of conditionals containing wh-based indefinites. In fact, some of Belyaev & Haug’s examples appear to be instances of unconditionals.

tives” by Flynn & Foley (2004) (see Flynn & Lust 1980 for an early argument to this effect).<sup>30</sup> Headed relatives, esp. the wh-based ones, are acquired well after the third year of age in English (Diessel 2004) and even later in French (Labelle 1990). In Czech, a language with frequent and productive wh-based relativization, wh-based headed relatives are acquired earlier (probably around three years of age), but still significantly later than wh-interrogatives and conditionals (Matiasovitsová et al. 2022). Moreover, the order of acquisition is not merely a function of parental input in the sense that the more a construction is produced by the parents, the more effective its acquisition by the child. Matiasovitsová et al. (2022) argue that the being exposed to constructions lower on the hierarchy fosters the development of more complex constructions. There is not much rigorous research into the acquisition of *bona fide* correlatives (i.e., not conditionals), but the limited evidence there is suggests that correlatives are acquired fairly early. For instance, Sharma (1974) reports early (before three years of age) acquisition of correlatives in Hindi. Šimík et al. (to appear) conducted an elicited imitation task to determine the order of acquisition of Czech correlatives and the string-identical light-headed relatives. Children around three years of age make significantly fewer errors in correlatives than light-headed relatives, despite the former being less frequent in child-directed speech (Matiasovitsová et al. 2022). This is consistent with the idea correlatives are semantically simpler (denoting propositions) than light-headed relatives (denoting derived properties).

## 7 Conclusion and open issues

Wh-constructions are syntactically and semantically highly complex entities, which have received plenty of attention in the generative and formal-semantic literature. The same holds of the constitutive elements of these constructions, namely wh-words, whose syntactic and semantic properties have often been in the spotlight of revolutionary linguistic research. The downside of this complexity is that most research concentrates on individual constructions and even their selected aspects. In this chapter, I have taken a bird’s eye view of the landscape of wh-constructions, in order not to lose sight of the forest for the trees. I hope to have demonstrated that the landscape is organized in a systematic and theoretically intriguing manner. Cross-linguistic, morphological, syntactic, but also developmental evidence all point to the conclusion that wh-constructions are hierarchically organized, beginning with the most fundamental wh-interrogatives, followed by (un)conditionals and correlatives, then by free and light-headed (aka headless) relatives, and finishing with the most complex headed relatives.

I proposed to model this wh-hierarchy in syntax, by assigning wh-words a functional structure which incrementally grows along the hierarchy and which mirrors the functional structure of the clausal left periphery. The syntactic nature of the hierarchy is manifested not just in syntax (esp. wh-movement), but also in morphology (via superset-based phrasal spellout), semantics (via incrementally increasing semantic complexity), and diachronic and L1-acquisition pathways. In section 3 I offered particular syntactico-semantic analyses of all the wh-constructions under discussion. These analyses build on previous literature, but are not always considered standard. I believe that the multi-faceted evidence provided in this chapter can be used in support of these analyses. At the same time, however, I would be hesitant to militate for a single analysis/parsing for each individual wh-construction. It is possible that one wh-construction can be analyzed/parsed in multiple ways – some simple, others more complex. Wh-interrogatives represent a good example. While the evidence I have put forth suggests that their analysis should be very simple, one cannot rule out the possibility that the simple analysis is complemented by more complex machinery for expressing more complex meanings associated with interrogativity, such as exhaustivity, multiple interrogatives, propositional attitudes and so forth.

The comprehensive view of wh-constructions that I have put forth necessarily leaves some issues open and raises questions. For instance, it is likely that the proposed wh-hierarchy is only one (albeit important) factor determining the nature of the individual wh-constructions. An important factor that I

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<sup>30</sup>This primacy of free, or rather headless relatives, might well be independent of wh-word acquisition, as it has also been observed for languages which do not employ wh-words for relativization, such as Chinese (Packard 1988) or Korean (Lee 1991).

have neglected concerns the use-conditions of the individual constructions. For instance, while conditionals and correlatives appear quite low on the hierarchy and are therefore, in a sense, “simple”, they happen to be relatively infrequent and stylistically marked in languages which productively use wh-words for more complex wh-constructions such as free or headed relatives. The wh-hierarchy relates to grammatical competence and has little to say about performance factors, which, however, may well have an impact on the overall system. Another factor left aside in this chapter is the sortal restriction of individual wh-words. More specifically, there is evidence that some wh-sorts are – cross-linguistically – more likely to be employed for functions higher on the hierarchy than others. The one that seems to be most flexible in this respect is the wh-word ‘where’; the one that is mostly very restricted is ‘who’. A related issue is how the wh-hierarchy interacts (if at all) with Keenan & Comrie’s (1977) accessibility hierarchy. The last factor that merits special attention is the factor of embedding and in particular the contrast between root and embedded interrogatives. It is clear, for instance, that some properties attributed to the complexity hierarchy, such as the loss or growth of complexity of wh-morphology, can arise due to embedding alone. Example of that are languages (such as Akan and Hausa, Zimmermann 2018; but also Romance, Kellert 2018), whose embedded interrogatives can take the form of headless or headed relative clauses. A similar concern applies to wh-movement: while root interrogatives can involve wh-in-situ even in canonically wh-movement languages, provided that the right discourse conditions are met, wh-in-situ in embedded interrogatives is clearly much more restricted (see Bobaljik & Wurmbrand 2015).

One notable missing piece in the wh-hierarchy concerns modal existential constructions (Šimík 2011). The reason why I have excluded them for the moment is that they are puzzling in multiple ways. They almost exclusively use interrogative wh-morphology; only rarely do they allow for wh-words with rel-morphemes (particularly in Hungarian). This suggests that they should be very low on the wh-hierarchy, even lower than, say, correlatives. At the same time, however, their wh-words undergo obligatory wh-movement, which is typical of relative clauses. Also, there are good reasons to assume that they denote properties (Caponigro 2003; Šimík 2013) rather than open propositions (cf. Pancheva Izvorski 2000; Šimík 2009). Last but not least, despite their morphological affinity to wh-interrogatives, they are relatively limited in cross-linguistic distribution; with the exception of Yiddish, they are not attested in Germanic languages, for instance, which otherwise make productive use of most other constructions on the hierarchy.

Besides these fairly general issues, the wh-hierarchy invites one to explore various specific empirical and theoretical issues, pertaining to all domains of grammar. To give an example of a syntactico-semantic issue, I note that some Slavic languages (like Czech or Slovenian) possess multiple strategies for expressing conditionals; some employ wh-in-situ, others wh-ex-situ. This apparent optionality appears to have interpretive consequences, with the ex-situ variant being more interpretively restricted (similarly to ever free relatives) than the in-situ variant. It is tempting to tie this to the wh-hierarchy, whereby the wh-movement is an indicator of higher syntactic complexity, which in turn limits the interpretive options. When it comes to morphology, the wh-hierarchy calls for a much more rigorous nanosyntactic analysis of the attested lexicalization patterns. While the wh-morpheme itself is virtually always a prefix on the sortal (nominal) stem, the rel-morpheme can be both a prefix (as in Greek or Hungarian) or a suffix, or rather a postfix (as in Bulgarian or Slovenian). These and other morphological properties will definitely be instructive in spelling out a more precise analysis of wh-words – within and across languages.

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