

# Unveiling Multiple *wh*- Free Relative Clauses and their functional *wh*-words

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**Abstract:** We provide the first description and compositional semantic analysis of a construction that we label “multiple *wh*- free relative clauses”—a kind of embedded non-interrogative *wh*- clause with more than one *wh*-word. We show that multiple *wh*- free relative clauses are closely related to the more familiar free relative clauses with just one *wh*- word—single *wh*- free relative clauses. We argue that a fully satisfactory semantic analysis for multiple *wh*- free relative clauses can be grounded in the semantic analyses that have been proposed for single *wh*- free relative clauses, but crucially requires non-trivial broadening of the meaning of *wh*-words. Focusing on Romanian, we propose a compositional account of multiple *wh*- FRs building on two main components: (i) the assumption that *wh*-words can license complex traces/variables with a functional component—an option that has been independently argued for several other *wh*- constructions, and (ii) a new functional meaning for *wh*-words—a close variant of the functional meaning of *wh*-words that has been independently proposed to account for functional *wh*- interrogative clauses.

**Keywords:** free relative clauses, multiple *wh*- clauses, functional *wh*-words

## 1. Introducing multiple *wh*- free relative clauses

*Wh*- clauses are full clauses characterized by the necessary presence of at least one *wh*-phrase.<sup>1</sup> They are well-attested across languages and manifest themselves in different syntactic and semantic shapes, with various levels of productivity, both within a given language and across languages: *wh*- interrogative clauses, headed relative clauses, correlative clauses, and free relative clauses—just to mention a few. *Wh*- clauses with more than one *wh*-phrase raise at least a couple of main issues. Which kinds of *wh*- clauses allow for more than one *wh*-phrase and which don't? Can the semantic analyses that have been proposed for **single *wh*- clauses** (i.e., *wh*- clauses with one *wh*-phrase) be straightforwardly extended to **multiple *wh*- clauses** (i.e., *wh*- clauses with more than one *wh*-phrase) and, in particular, can the meaning that has been assumed for *wh*-words in single *wh*- clauses be retained and applied to *wh*-words in multiple *wh*- clauses as well? To the best of our knowledge, these two broad issues have not yet been

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<sup>1</sup> We use the term *wh*-phrase to refer to both a simple phrase that is made of just a *wh*-word (e.g., *who*, *where*) and a more complex phrase containing a *wh*-word together with other lexical material (e.g., *by means of which device*).

systematically investigated within languages, let alone across languages. They are relevant issues not just for a more complete description of *wh*- clauses but also, and crucially, for a better understanding of the semantic behavior of *wh*-words—one of the most powerful and least understood building blocks of the logic behind human language. In this paper, we focus on a construction that exemplifies both issues: (i) it is a multiple *wh*- clause whose existence has not yet been fully recognized, unlike its single *wh*- variant, and (ii) its semantic analysis cannot be a simple extension of its single *wh*- variant but requires non-trivial broadening of the meaning of its *wh*-words. We label this construction a **multiple *wh*- free relative clause** or, in short, a **multiple *wh*- FR**. We focus our investigation on Romanian, a language with an articulated system of multiple *wh*- FRs. Examples are given in brackets in (1)–(4).

- (1) Bunica a împachetat [ **ce cui**      dă      de Crăciun.]<sup>2</sup>  
 Grandma has wrapped      what who.DAT gives for Christmas  
*Roughly*: ‘Grandma wrapped the things she’ll give to the appropriate people on Christmas.’
- (2) Muncitorii au montat [ **ce cum**      fusese      instalat înainte de incendiu.]  
 workers-the have.3PL assembled what how had.been.3SG installed before of fire  
*Roughly*: ‘The workers assembled the things that had been installed in the appropriate/ corresponding ways before the fire.’
- (3) Bunica a pregătit [ **ce când**      va      lua în următoarele săptămâni.]  
 Grandma has prepared what when will.3SG take in next-the weeks  
*Roughly*: ‘Grandma prepared the things that she’ll take at their appropriate time in the next weeks.’
- (4) Proprietarul a aranjat [ **ce unde**      a trebuit instalat.]  
 owner-the has arranged what where has needed installed  
*Roughly*: ‘The owner arranged the things that needed to be installed in the appropriate place.’

The multiple *wh*- FRs in (1)–(4) are full clauses containing two *wh*-words, all in clause-initial position in a fixed order, as in multiple *wh*- interrogative clauses in Romanian. Still, the multiple *wh*- FRs in (1)–(4) occur as the complements of matrix predicates that usually select for a DP in their complement position, rather than a clause. The multiple *wh*- FRs in (1)–(4) are not interpreted as conveying a question, but as referring to a maximal (plural) individual, as (plural) definite DPs do. In all of the multiple *wh*- FRs in (1)–(4), the first *wh*-word affects the interpretation of the other one in a way that we tried to partially render with the adjective

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<sup>2</sup> Our ten consultants are all from Transylvania, a region from North-Western and Central Romania. Two anonymous conference abstract reviewers reported that in their (unspecified) variety of Romanian multiple *wh*- FRs are not allowed. Subsequent feedback from colleagues suggests a split between northern dialects (which allow multiple *wh*- FRs) and southern ones (which disallow them), but further investigation is necessary to determine the extent and nature of the observed variation. From now on, whenever we use the label *Romanian* in discussing multiple *wh*- FRs, we are specifically referring to the variety of Romanian spoken in Transylvania, unless mentioned otherwise.

“appropriate” or “corresponding” in most translations. The precise nature of this “functional” connection is at the center of the paper and will be discussed at length.

In brief, we argue that multiple *wh*- FRs are free relative clauses, rather than any other new or already attested kind of *wh*- clause in Romanian. At the same time, we show that a satisfactory compositional account of the semantic behavior of multiple *wh*- FRs requires a revision of the semantic contribution of *wh*-words that is usually assumed for single *wh*- FRs. This revision will introduce a “functional” component in the lexical entry of *wh*-words and their traces that will be very close to what has been argued for in the case of the so-called functional interpretations of single *wh*- interrogative clauses and headed relative clauses with universally quantified subjects across languages (Engdahl 1980, 1986; Groenendijk and Stokhof 1984; Chierchia 1991, 1993; Jacobson 1994; Dayal 1996, 2016; Sharvit 1999a,b, a.o.). Therefore, our investigation of Romanian and its multiple *wh*- FRs broadens the meaning space of *wh*-words in free relative clauses and in general. In doing so, it also highlights how this meaning space is constrained and holds across different kinds of *wh*- clauses.

We also provide further evidence that free relative clauses in general cannot be reduced to headed relative clauses without an overt nominal head. If this were the case, then languages like Romanian would be expected to have multiple *wh*- headed relative clauses. Although Romanian does make use of a subset of *wh*-words to introduce headed relative clauses, they are not exactly the same subset that single *wh*- FRs make use of (see Grosu 2013; Caponigro & Fălăuș 2017). More crucially, it is not possible to have a headed relative clause with more than one *wh*-word. The bracketed string in (5) shows an attempt to build a headed relative clause with the *wh*-words for ‘which’ and ‘when’, which can introduce headed relative clauses separately. The result is completely unacceptable, regardless of the presence of either both the DP head (‘the cake’) and PP head (‘at the moment’), or only the former.

- (5) \*Am mâncat prăjitura (în momentul) [pe care când mi-ai  
 have.1SG eaten cake-the at moment-the ACC which when CL.1SG-have.2SG  
 adus-o.]  
 brought-it  
*Intended interpretation:* ‘I ate the cake you brought me when you brought it to me.’

Lastly, our investigation aims to encourage and contribute to a cross-linguistic investigation. There are strong reasons to believe that multiple *wh*- FRs are not confined to Romanian. Below we provide some preliminary cross-linguistic evidence from speakers of varieties of American English, Franconian German, Czech, and Serbian. We hope that the methodology and the series of tests that we have developed will help unveil multiple *wh*- FRs across more languages.<sup>3</sup>

- (6) I gave you [**what** you had to put **where**.] [American English]

<sup>3</sup> The judgments about American English come from one speaker from Maryland and one from Georgia. The Franconian German example and relative judgments come from a speaker from Baden-Württemberg. We are grateful to Daniel B. Kane, Harold Torrence, Eva Wittenberg, Radek Šimík and Boban Arsenijevic for the data and the judgments.

- (7) Ich bereite vor, [ **was** wir **wem** geben müssen.] [German]  
 I prepare what we whom give must  
 ‘I’ll prepare what we should give to the appropriate people.’
- (8) Zabalili jsme [ **co** **komu** dáme na Vánoce.] [Czech]  
 packed be.aux.1pl what.acc who.dat give.1pl on Christmas  
 ‘We wrapped the things we’ll give to the appropriate people on Christmas.’
- (9) Spakovali smo [ **šta** ćemo **kome** pokloniti za Božić.] [Serbian]  
 packed.MPI AUX1PL what AUX1PL who.Dat give for Christmas.  
 ‘We wrapped the things we’ll give to the appropriate people on Christmas.’

We proceed as follows. In the next section, we describe multiple *wh*- FRs in Romanian in more detail and introduce their main properties. In Section 3, we show that they cannot be reduced to any other *wh*- clause that is attested in Romanian but free relative clauses. Section 4 offers a compositional account of multiple *wh*- FRs building on two main components: (i) the assumption that *wh*-phrases can license complex traces/variables with a functional component, an option that has been independently argued for several other *wh*- constructions, and (ii) a new functional meaning for *wh*-phrases, a variant of the functional meaning of *wh*-phrases that has been independently proposed to account for functional *wh*- interrogative clauses. Section 5 concludes and discusses some open issues for future research.

## 2. Main properties of multiple *wh*- FRs

In this section, we highlight four core properties that characterize multiple *wh*- FRs in Romanian. We start with two distributional properties: one having to do with where multiple *wh*- FRs occur within their matrix clause (Section 2.1) and the other with the *wh*-phrases that cannot introduce multiple *wh*- FRs (Section 2.2). We then turn to properties pertaining to the interpretation of multiple *wh*- FRs: their referentiality and maximality (Section 2.3) and the “functional” component that is associated with their interpretation (Section 2.4). Each of these properties will give rise to one or more tests that we use in the next section (Section 3) to compare multiple *wh*- FRs with other kinds of *wh*- clauses, of which Romanian has several. A formal and compositional account for most of these properties is provided in Section 4.

### 2.1 Distribution of multiple *wh*- FRs within their matrix clauses

Multiple *wh*- FRs always occur in an argument position<sup>4</sup> of the matrix clause and can always be replaced by a DP, despite being clausal and looking more like CPs. For instance, the multiple *wh*- FR we saw in (2) above can be replaced (and roughly paraphrased) with the definite DP in brackets in (11).

<sup>4</sup> As we discuss in Section 3.6, multiple *wh*- FRs seem to be allowed in adjunct position as well, but, in those positions, they look identical to another *wh*- construction. Therefore, what looks like the same string can be interpreted in two different ways, making speakers’ judgments significantly harder. For this reason, we chose to focus on multiple *wh*- FRs in argument positions at this stage of our investigation.

- (10) Muncitorii au montat [**ce cum** fusese instalat înainte de incendiu.]  
 workers-the have.3PL assembled what how had.been installed before of fire  
*Roughly*: ‘The workers assembled the things that had been installed in the appropriate/  
 corresponding ways before the fire.’
- (11) Muncitorii au montat [<sub>DP</sub> **mobila** în felul în care fusese  
 workers-the have.3PL assembled furniture-the in way-the in which had.been  
 instalată înainte de incendiu.]  
 installed before of fire  
 ‘The workers assembled the furniture in the way in which it had been installed before the  
 fire.’

## 2.2 Restrictions on *wh*-phrases introducing multiple *wh*- FRs

Multiple *wh*- FRs cannot be introduced by the *wh*-phrase [*care* NP] (‘which’ NP). The bracketed string in (12) is almost identical to the multiple *wh*- FR in (1), except that the simple *wh*-phrase *ce* ‘what’ in (1) has been replaced with the complex [*care* NP] (‘which’ NP). The resulting sentence is unacceptable. On the other hand, if *ce* ‘what’ (1) is replaced with the complex *wh*-phrase [*ce* NP] (‘what’ NP), as in (13), the resulting sentence is acceptable, which shows that there is no independent incompatibility between multiple *wh*- FRs and complex *wh*-phrases.

- (12) \* Bunica a împachetat [**care cadou(ri) cui** ă de Crăciun.]  
 Grandma has wrapped which gift(s) who.DAT gives for Christmas
- (13) Bunica a împachetat [**ce cadou(ri) cui** ă de Crăciun.]  
 Grandma has wrapped what gift(s) who.DAT gives for Christmas  
 ‘Grandma wrapped the gifts she’ll give to the appropriate people on Christmas.’

The ban on the use of [*care* NP] applies to single *wh*- free relatives as well, as we will show in Section 3.1.

A similar restriction concerns the use of *cine* ‘who’, which cannot head a multiple *wh*- FR, as suggested by the unacceptability of the sentences in (14):

- (14) a. \* A venit [**cine unde** l-a cunoscut pe Ion.]  
 has come who where him-has met ACC Ion  
*Intended*: ‘The people who met Ion at the corresponding place (where they met him)  
 have arrived.’
- b. \* Bunica a îmbrățișat [pe **cine când** a sosit.]  
 Grandma has hugged ACC who when has arrived  
*Intended*: ‘Grandma hugged the people who arrived at the corresponding time.’

- c. \* Organizatorul a vorbit cu [cine ce aduce la petrecere.]  
 organizer-the has talked with who what brings to party  
*Intended:* ‘The organizer talked with who brings what to the party.’

Once again, this restriction is also observed in single *wh*- FRs, although it seems to be stronger in multiple *wh*- FRs. As illustrated in (15), *cine* FRs in Romanian are not as common or as easily acceptable as FRs introduced by other *wh*-phrases, regardless of whether they are in subject or object position in their matrix clause. The extent and the source of this restriction is not well understood.<sup>5</sup>

- (15) a. ??[Cine l-a cunoscut pe Ion] l-a votat.  
 who him-has known ACC Ion him-has voted  
 ‘Who knew Ion voted for him.’  
 b. ?? Victima a văzut [pe cine ai văzut și tu].  
 victim-the has seen ACC who have.2SG seen also you  
 ‘The victim saw whom you saw.’  
 c. ?? Ana a îmbrățișat [pe cine a cunoscut la petrecere].  
 Ana has hugged ACC who has met at party  
 ‘Ana hugged whom she met at the party.’

### 2.3 Referentiality and maximality

Multiple *wh*- FRs are always interpreted as referential and maximal, like definite DPs. Referentiality is the semantic property of referring to an individual (or a portion of matter, or a kind). A referential expression is, therefore, non-quantificational. Maximality is the property that some referential expressions have to refer to the maximal individual of a given set. For instance, the definite DP *the dogs* is referential and maximal because it refers to the maximal plural individual made of the sum of all the single dogs in the given context. The deictic DP *those dogs* is referential, but not maximal: it can refer to a plural individual resulting from the sum of some, but not necessarily all, the single dogs in the given context. Finally, quantificational DPs like *some dogs* and *every dog* are neither maximal nor referential.

<sup>5</sup> In his detailed overview of relative clauses in Romanian, Grosu (2013) does not mention any restriction on the use of *cine* ‘who’ in FRs. However, the examples he gives allow a free choice reading of *cine*, which can be paraphrased as ‘whoever’ (i)-(ii).

- (i) [Cine îl cunoaște pe Ion] nu poate decât să-l admire. (Grosu 2013: 654)  
 who him knows ACC Ion not can but SUBJ-him admire.3  
 ‘Whoever knows Ion can’t help admiring him.’  
 (ii) Ion a întâlnit [pe cine a întâlnit și Maria]. (Grosu 2013: 643)  
 Ion has met ACC who has met also Maria  
 ‘Ion met who Maria met.’

In fact, in both sentences *cine* could easily be replaced with the morphologically related free choice item *oricine* ‘anyone’/‘whoever’ without any change in meaning. When *cine* FRs are episodic (15), our consultants find them degraded. See Patterson & Caponigro (2016) for a detailed discussion of what looks like a similar degraded status of *who* FRs in English and the factors at play.

One piece of evidence that multiple *wh*- FRs are referential and maximal comes from the fact that speakers agree with paraphrasing them by means of referential and maximal expressions like definite DPs. For instance, the multiple *wh*- FR we started with in (1) can be roughly paraphrased using the complex definite DP in (16).

- (16) Bunica a împachetat [<sub>DP</sub> **lucrurile** pe care le va oferi oamenilor  
Grandma has wrapped things-the ACC REL CL will.3SG offer people-the.DAT  
de Crăciun.]  
for Christmas  
'Grandma wrapped the things that she'll give to the people they are for at Christmas.'

There is also another device to test maximality: by building a scenario that would force a multiple *wh*- FR to violate it. For instance, imagine a situation in which grandma started wrapping Christmas gifts, and managed to wrap 3 out of 10 before she got interrupted. In this scenario, it is not felicitous for the speaker to utter the sentence in (17)a with the bracketed multiple *wh*- FR, nor the sentence in (17)b with the bracketed definite DP instead of the multiple *wh*- FR. Both constituents refer to the maximal individual of the set of things that grandma will give for Christmas. By combining these constituents with the matrix predicate 'wrap' and the remainder of the sentence, the two-place relation of wrapping is claimed to hold between grandma and the maximal plural individual made of those 10 gifts, which would be false, since 7 of them are still unwrapped. Notice that in this scenario a DP can occur as the complement of the matrix predicate, as long as it is not definite, as shown by the bracketed indefinite DP in (17)c.

- (17) a. # Bunica a împachetat [**ce cui** dă de Crăciun.]  
Grandma has wrapped what who.DAT gives for Christmas  
'Grandma wrapped the things she'll give to the appropriate people on Christmas.'  
b. # Bunica a împachetat [<sub>DP</sub> **lucrurile** pe care le va oferi de Crăciun.]  
Grandma has wrapped things-the ACC REL CL will.3SG offer for Christmas  
'Grandma wrapped the things that she'll give for Christmas.'  
c. Bunica a împachetat [<sub>DP</sub> **niște lucruri** pe care le va oferi de Crăciun.]  
Grandma has wrapped some things ACC REL CL will.3SG offer for Christmas  
'Grandma wrapped some things that she'll give for Christmas.'

The test above allows us to conclude that multiple *wh*- FRs do not behave like indefinites, i.e., existentially quantified DPs. The examples in (18)a-c below show that multiple *wh*- FRs do not behave like universally quantified DPs either. Multiple *wh*- FRs can occur as the complement of *mare parte* 'a big part/most of' in a partitive construction, as shown in (18)a. Definite DPs exhibit the same behavior, as shown in (18)b. On the other hand, universally quantified DPs cannot occur as the complement of a partitive, as shown by the degraded status of (18)c.

- (18) a. Bunica a fabricat mare parte din [ **ce cui**      dă      de Crăciun. ]  
 Grandma has made big part of what who.DAT gives for Christmas  
 ‘Grandma made most of the things she gives to the people they were made for at Christmas.’
- b. Bunica a fabricat mare parte din [ **lucurile** ce vor      fi      dăruite  
 Grandma has made big part of things-the REL will.3PL be offered  
 oamenilor de Crăciun.]  
 people-the.DAT for Christmas  
 ‘Grandma made most of the things that will be offered to people at Christmas.’
- c. ??Bunica a fabricat mare parte din [ **tot**      ce va      dărui  
 Grandma has made big part of everything REL will.3SG offer  
 oamenilor de Crăciun. ]  
 people-the.DAT for Christmas  
*Intended interpretation:* ‘Grandma made most of everything she will offer to people at Christmas.’

In conclusion, multiple *wh*- FRs share the same semantic properties as definite DPs: they are referential and maximal.

## 2.4 *Wh*-phrases and functional dependencies

The last property of multiple *wh*- FRs that we discuss is semantic as well. Unlike maximality, it does not have to do with the overall meaning of a multiple *wh*- FR, but rather the way the *wh*-phrases are interpreted. In particular, in all multiple *wh*- FRs, the first *wh*-phrase—the *wh*-phrase preceding and c-commanding all the others—behaves differently from the other *wh*-phrase and its interpretation affects the interpretation of the other *wh*-phrase(s). To see this, let us consider the example in (19)—a slight variant of the example in (3).

- (19) Azi mama a pregătit [ **ce când** va      lua bunica în următoarele  
 today mom has prepared what when will.3SG take grandma in next-the  
 săptămâni.]  
 weeks  
 ‘Today mom prepared what grandma will take at its appropriate time in the next weeks.’

This sentence would be used in a context like the following: imagine grandma is getting worried about having a lot of medication to take, at different times of the day, and having it all mixed up. To put her mind at ease, mom prepared grandma’s morning and evening medication for the next few weeks, putting it in separate boxes so that grandma doesn’t get confused. In this context, it is clear that for each medicine mom prepared, there is an *appropriate/unique* time for it to be taken. Crucially, (19) cannot mean that today mom prepared what grandma will take at some *random/non-unique* time in the next weeks, with the *wh*-phrase *când* ‘when’ acting as an existentially quantified expression. Nor can it mean that today mom prepared what grandma will take at *that one specific* time in the next weeks, with *când* acting as a free pronoun over instances whose reference is contextually determined. In other words, the time at which each

medication has to be taken is functionally dependent on the specific medication: each medication is associated with a unique specific time.

Speakers share this “functional” intuition across all multiple *wh*- FRs we have discussed: their interpretation of the rightmost/c-commanding *wh*-phrase (or, more precisely, of the argument that the *wh*-phrase plays the role of) depends on the interpretation of the leftmost *wh*-phrase (or, more precisely, of the argument that the c-commanded *wh*-phrase plays the role of). This kind of functional dependency is from one individual to another, i.e., a Skolem function, as we discuss in detail in Section 4.

### 3. Multiple *wh*- FRs are free relative clauses rather than any other *wh*- clauses

In this section, we compare multiple *wh*- FRs with other *wh*- clauses in Romanian using the properties of multiple *wh*- FRs we introduced in Section 2 and various related tests. We conclude that multiple *wh*- FRs are free relative clauses, while they exhibit crucial differences with all the other *wh*- clauses that are found in Romanian, in particular Rudin’s multiple *wh*- clauses, *wh*- interrogative clauses, correlative clauses, and modal existential constructions.

#### 3.1. Multiple *wh*- FRs are free relative clauses

The discussion above revealed the following properties of multiple *wh*- FRs in Romanian:

- (i) they occur in argument position of the matrix predicate
- (ii) they cannot be introduced by the *wh*-phrases *cine* ‘who’ and *care NP* ‘which NP’
- (iii) they are referential and maximal, just like definite DPs
- (iv) the second *wh*-word receives a functional interpretation

The first three properties also characterize single *wh*- FRs (on single *wh*- FRs in Romanian, see e.g., Grosu 2003, 2013; Caponigro & Fălăuș 2017): any one of the multiple *wh*- FRs above could be replaced with its single *wh*- variant, without changing the argumentation: single *wh*- FRs occur in argument positions (20), disallow the use of *care NP* ‘which NP’ (21) and *who* ((22), as well as the examples in (15)) and are maximal, referential expressions (23):

- (20) Muncitorii au montat [ce fusese instalat înainte de incendiu.]  
workers-the have.3PL assembled what had.been installed before of fire  
‘The workers assembled the things that had been installed before the fire.’
- (21) a. \*Bunica a împachetat [care cadou(ri) dă de Crăciun.]  
Grandma has wrapped which gift(s) gives for Christmas  
b. Bunica a împachetat [ce cadou(ri) dă de Crăciun.]  
Grandma has wrapped what gift(s) gives for Christmas  
‘Grandma wrapped the gifts she’ll give on Christmas.’
- (22) ?? Bunica a îmbrățișat [pe cine a văzut la petrecerea de Crăciun.]  
Grandma has hugged ACC who has seen at party-the of Christmas  
‘Grandma hugged the people she saw at the Christmas party.’

- (23) a. CONTEXT: *Grandma started wrapping her Christmas gifts, but got interrupted*  
 #Bunica a împachetat [ **ce** va oferi de Crăciun. ]  
 Grandma has wrapped what will.3SG offer for Christmas  
 ‘Grandma wrapped the things she’ll give for Christmas.’
- b. Bunica a fabricat **mare parte din** [ce dă de Crăciun. ]  
 Grandma has made big part of what gives for Christmas  
 ‘Grandma made most of the things she gives for Christmas.’

In view of these similarities, we conclude that multiple *wh*- FRs are free relative clauses. To further support this conclusion, we now provide evidence that they differ in significant ways from other multiple *wh*- constructions that are attested in Romanian.

### 3.2 Multiple *wh*- FRs are not Rudin’s multiple *wh*- relative clauses

To our knowledge, the literature has so far only mentioned multiple *wh*- FRs in a few languages, mostly spoken in the Balkans (Bulgarian, Macedonian, Romanian). Rudin (1986, 2007, 2008) has been the first to discuss multiple *wh*- relative constructions<sup>6</sup>, providing examples from Romanian like (24)–(25) (given with Rudin’s original translation).

- (24) Trăncănește [**cine ce** vrea. ] [Rudin 2007: 302]  
 blabs who what wants  
 ‘Everyone’s blabbing whatever they want.’
- (25) Mănâncă [**cine ce** vrea. ] [Rudin 2008: 260]  
 eats who what wants  
 ‘Let everyone eat whatever they want.’

Rudin analyzes each of the bracketed multiple *wh*- clauses in (24)–(25) as a “headless relative clause in a non-left-peripheral, argument position”, i.e., a free relative clause with more than one *wh*-word (Rudin 2008). However, despite the common label of ‘multiple *wh*- free relative clause’, we think that these examples are different from the multiple *wh*- FRs we investigate in this paper and, more generally, the two kinds of multiple *wh*- clauses exhibit several properties that set them apart.

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<sup>6</sup> To our knowledge, in addition to Rudin’s work, the only other two papers that mention multiple *wh*- clauses such as those in (24)–(25) are Citko & Gračanin-Yuksek (2016), which discusses Croatian, and Dimova & Tellier (2018), which discusses Bulgarian. Both papers argue that these constructions are not multiple *wh*- FRs.

The first property is the relation between the *wh*-words and the predicates in the matrix and relative clause. In the examples in (24)–(25) above, each *wh*-word is related to an argument of *both* the matrix and the embedded predicate: the people blabbing/eating are the ones that want to blab/eat and the things they blab/eat are the things they want to blab/eat. An even clearer example is the one in (26), where the agent(s) and the patient(s) of the attacking and the finding are the same. (27) shows that it is also possible to have adjunct *wh*-words in these constructions, once again modifying both the matrix and the embedded predicate.

(26) A atacat [**cine pe cine** a găsit.]  
has attacked who ACC who has found  
'Everyone attacked whoever they found.'

(27) Fac [**ce când** am chef.]  
do.1SG what when have.1SG urge  
'I do whatever I feel like doing whenever I feel like doing it.'

In contrast, our multiple *wh*- FRs satisfy only one argument of the matrix predicate (typically the object) and the second *wh*-word is in no way related to the matrix predicate. In (28), for instance, repeated from (1), the *wh*-clause refers to a set of objects wrapped by grandma; the receiver of the gifts is an argument of the embedded predicate 'give' and clearly not an argument of the predicate 'wrap'.

(28) Bunica a împachetat [**ce cui** de Crăciun.]  
Grandma has wrapped what who.DAT gives for Christmas  
'Grandma wrapped the things she'll give to the appropriate people on Christmas.'

Second, the interpretation of the *wh*-words in (24)–(27) is akin to a universal quantifier or a free choice item, like 'anyone' or 'whoever'. These elements can also replace the *wh*-words without any detectable change in meaning, as shown in (29), where the first *wh*-word is replaced by the universal quantifier *fiecare* 'every' and (30), where both *wh*-words have been replaced by free choice elements, which in Romanian are realized by prefixing the *wh*-words with *ori*- (see e.g., Farkas 2002, 2013; Caponigro & Fălăuș 2017):

(29) Trăcănește **fiecare ce** vrea.  
blabs everyone what wants  
'Everyone's blabbing anything/whatever they want.'

(30) Trăcănește **oricine orice** vrea.  
blabs FC-who FC-what wants  
'Anyone's blabbing anything/whatever they want.'

These substitutions are not possible in multiple *wh*- FRs. (31)a shows a variant of the multiple *wh*- FR in (28) in which the first *wh*-expression has been replaced by a universal quantifier (in bold). In (31)b, instead, both *wh*-expressions in (28) have been replaced by free choice items (in bold). Both resulting sentences are ungrammatical.

- (31) a. \*Bunica a împachetat [**fiecare cadou cui**      dă      de Crăciun.]  
 Grandma has wrapped    every gift    who.DAT gives    for Christmas  
*Intended:* ‘Grandma wrapped every gift she’ll give to the appropriate people on Christmas.’
- b. \*Bunica a împachetat [**orice oricui**      dă      de Crăciun.]  
 Grandma has wrapped    FC-what FC-who.DAT gives    for Christmas  
*Intended:* ‘Grandma wrapped anything she’ll give to anyone on Christmas.’

A further difference between the two kinds of multiple *wh*- clauses concerns the distribution of *who*. The use of *cine* ‘who’ is extremely productive in the multiple *wh*- constructions discussed by Rudin (24)–(27). In contrast to this, as already pointed out in Section 2.2, we haven’t found any examples of our multiple *wh*- FR introduced by *cine* ‘who’ as illustrated in (32) (see also (14)):

- (32) a. \*A împachetat [**cine ce**      dă      copiilor      de Crăciun.]  
 has wrapped    who what gives    children.DAT for Christmas
- b. \*Am îmbrățișat [pe **cine cui**      a      oferit      cadouri de Crăciun.]  
 has wrapped    ACC    who who.DAT has    offered    gifts      for Christmas

Finally, it should be mentioned that the acceptability of the construction in (24)–(27) is not subject to any kind of speaker or dialectal variation—examples such as these are extremely productive and systematically accepted by native speakers. In contrast, our multiple *wh*- FRs are more restricted and are only accepted by a subset of speakers (see footnote 2). This, we think, provides further support for the claim that we are dealing with two different multiple *wh*- constructions. In this paper, whenever we use the label *multiple wh- FRs*, we are referring to examples such as (1)–(4), and not to the kind of construction analyzed by Rudin, whose proper investigation we leave for future research.

### 3.3 Multiple *wh*- FRs are not interrogative clauses

Multiple *wh*- interrogative clauses are widespread across languages (see e.g., Dayal 2016 for a recent overview). They are very productive in Romanian as well (Comorovski 1996, Rațiu 2011), both as matrix and embedded clauses, as shown in (33) and (34).

- (33) a. **Cine ce**      a      făcut azi?  
 who what has done today  
 ‘Who has done what today?’
- b. Mă întreb      /      spune-mi [**cine ce**      a      făcut azi.]  
 me wonder.1SG/tell.2SG-me who what has done today  
 ‘I wonder/tell me who has done what today.’
- (34) a. **Ce unde** trebuie pus?  
 what where must put  
 ‘What must be put where?’

- b. Mă întreb / spune-mi [ **ce unde** trebuie pus.]  
 me wonder.1SG/ tell.2SG-me what where must put  
 ‘I wonder/tell me what to put where.’

There are at least three properties indicating that multiple *wh*- FRs are not interrogative clauses. First, like single *wh*- FRs, multiple *wh*- FRs can occur as arguments of non-interrogative predicates like ‘assemble’, ‘prepare’, ‘manufacture’ or ‘wrap’, as shown above in (1)–(4). None of these predicates can take a polar or *wh*- interrogative clause as its complement.

Second, recall from Section 2.2 above that multiple *wh*- FRs disallow the use of the *wh*-phrase *care NP* ‘which NP’ as the first *wh*-phrase, as in (35)a, as well as that of *cine* ‘who’, as in (35)b. In contrast, *care NP* and *cine* can perfectly well introduce (matrix or embedded) multiple *wh*- interrogative clauses, as shown in (36)a-b, respectively.

- (35) a. \*Bunica a împachetat [**care cadouri cui**      dă de Crăciun. ]  
 Grandma has wrapped    which gifts    who.DAT gives for Christmas  
 b. \*A venit [**cine unde** l-a            cunoscut pe Ion.]  
 has come    who where him-has met       ACC Ion

- (36) a. (Bunica se întreabă) [**care cadouri cui**      le      dă de Crăciun.]  
 Grandma REFL wonders    which gifts    who.DAT CL.3PL gives for Christmas  
 ‘(Grandma wonders) which gifts she gives to whom for Christmas.’  
 b. (Bunica se întreabă) [**cine unde** l-a            cunoscut pe Ion. ]  
 Grandma REFL wonders    who where him-has met       ACC Ion  
 ‘(Grandma wonders) who met Ion where.’

Third, the interpretation of multiple *wh*- FRs does not resemble the interpretation of (single or multiple) *wh*- interrogative clauses. We discuss the semantic contribution of multiple *wh*- FRs in more detail in Section 4. Here it suffices to observe that multiple *wh*- FRs denote (singular or plural) individuals, as highlighted by the definite descriptions paraphrasing them and the semantic properties discussed in Section 2. *Wh*- interrogative clauses, instead, denote a question, i.e., a set of propositions or some other semantic object different from individuals.

### 3.4 Multiple *wh*- FRs are not correlative clauses

In addition to multiple *wh*- interrogative clauses, some languages—including Romanian—also allow for multiple *wh*- correlative clauses like the bracketed strings in (37)a–b (see Dayal 1996; Brasoveanu 2008, 2012; Gajewski 2008; Citko 2009; Lipták 2009 a.o.).

- (37) a. [**Cine ce** și-a luat], *acela aia* să mănânce.  
 who what CL.3SG-has taken that-one that SUBJ eat.3SG  
 ‘Everyone should eat whatever (food) they picked.’  
 b. [**Ce unde** era], *aia acolo* să găsesc.  
 what where was that there SUBJ find.1SG  
 ‘I want to find everything where it was.’

Correlative clauses can be clearly distinguished from multiple *wh*- FRs. A well-known feature of correlative clauses—also illustrated in (37)a–b above—is that they occur at the periphery of their matrix clause (e.g., Dayal 1996; Lipták 2009). In contrast, as discussed in Section 2, multiple *wh*- FRs occur in argument positions within their matrix clauses (similarly to single *wh*- FRs), rather than dislocated. Furthermore, the *wh*-phrases that are used in a correlative clause have corresponding anaphoric (pronominal/demonstrative) markers in the matrix clause—typically one for each *wh*-phrase. FRs on the other hand (be they single or multiple *wh*- ones) do not have this property—their matrix clause does not contain anaphoric elements linked to their *wh*-phrases.

Finally, correlative clauses in Romanian can be introduced by the *wh*-expressions *care NP* ‘which NP’ and *cine* ‘who’—unlike multiple *wh*- FRs (see discussion in Section 2.2 above). This is illustrated in the sentences in (38)a–b (taken from Brasoveanu 2008: 48) and (39)a–b:

- (38) a. [**Care fată** și-a uitat ieri haina], pe *aceea* o caută  
 which girl her.DAT-has forgotten yesterday coat-the ACC DEM.3FSG her look for  
 tatăl ei.  
 father-the her.GEN  
 ‘The father of the girl that forgot her coat yesterday is looking for her.’
- b. [**Pe care om** l-a interogat Securitatea], în *acela* nu mai  
 ACC which person him-has interrogated security-the in DEM.3MSG NEG anymore  
 am încredere.  
 have.1SG trust  
 ‘I do not trust any person (whatsoever) that the secret police interrogated.’
- (39) a. [**Cine** m-a rănit odată], în *acela* nu mai am încredere  
 who me-has hurt once in DEM.3MSG not anymore have.1SG trust  
 ‘I don’t trust anyone who hurt me.’
- b. [**Pe cine** ți-a fost alături la greu], pe *acela* să-l ții aproape și la bine.  
 ACC who you-has been close at hard ACC DEM.3MSG SUBJ-him keep close at good  
*Roughly*: ‘Who(ever) has been there for you in hard times, you should keep them close  
 in good times.’

Given that neither defining property of correlative clauses (peripheral position, anaphoric marker) holds in multiple *wh*- FRs and taking into consideration the different distributions of *care NP* and *cine* in multiple *wh*-clauses, we conclude that multiple *wh*- FRs and correlative clauses are different constructions.

### 3.5 Multiple *wh*- FRs are not modal existential constructions

Multiple *wh*-“Modal Existential Constructions” (MECs) like the bracketed strings in (40)a–c constitute another—possibly less common—type of multiple *wh*- construction attested cross-linguistically.

- (40) a. Nu are [ **cine ce** să facă.]  
 not has who what SUBJ do.3SG  
 ‘There’s nothing anyone could do.’
- b. Nu avem [ **ce unde** pune], focul a distrus tot.  
 not have.1PL what where put.INF fire has destroyed everything  
 ‘There’s nothing to put anywhere, the fire destroyed everything.’
- c. Bunica nu are [ **ce cui** da /să dea de Crăciun.]  
 Grandma not has what who.DAT give.INF SUBJ give.3SG for Christmas  
 ‘Grandma doesn’t have anything to give to anybody for Christmas.’

Grosu (2004, 2013) and Šimík (2011) provide cross-linguistic evidence that multiple *wh*- MECs are introduced by a limited class of matrix predicates, i.e., existential ‘be’ and ‘have’, as illustrated in (40) with the Romanian existential predicate *a avea* ‘to have’. In contrast, predicates like ‘wrap’, ‘prepare’, and ‘assemble’ are not existential and do not embed MECs.<sup>7</sup> Since these are exactly the matrix predicates introducing the multiple *wh*- clauses in (1)-(3), we take it that the embedded multiple *wh*- clauses cannot be MECs.

Another, possibly stronger argument against a MEC analysis for the multiple *wh*- clauses we are investigating comes from mood. Grosu (2004, 2013) and Šimík (2011) extensively argue that MECs require the subjunctive or the infinitive, as also exemplified in the Romanian sentences in (40). In contrast, multiple *wh*- FRs do not impose any mood restrictions: all our examples of multiple *wh*- FRs allow the indicative, behaving like single *wh*- FRs in this respect as well.<sup>8</sup>

Lastly, MECs and multiple *wh*- FRs differ in their interpretation. MECs have been argued to have the meaning of existentially quantified expressions. As already suggested by the paraphrases above and discussed in the previous sections, this is unlike the semantic behavior of multiple *wh*- FRs, which semantically behave like definite descriptions. To see this more clearly, compare the sentences in (41) and (42). (41)a, with a MEC in brackets, asserts the existence of an unspecified non-empty set of things that grandma will offer to some unspecified

<sup>7</sup> There are other predicates that can introduce single MECs cross-linguistically, like ‘give’, ‘send’, ‘find’, ‘choose’, ‘get’. However, to our knowledge no *multiple wh*- MECs have been discussed in the literature with predicates other than ‘be’ and ‘have’ (see Šimík 2011 for more details), but see Section 3.6 for possible examples.

<sup>8</sup> This does not mean that FRs disallow the use of subjunctive. As (i)-(ii) show, subjunctive mood is also possible in FRs, both single and multiple *wh*- ones (on subjunctive mood in Romanian, see Farkas 1985, 1992):

- (i) Am împachetat [ **ce** să iei cu tine. ]  
 have.1SG wrapped what SUBJ take.2SG with you  
 ‘I wrapped/packed what you should take with you.’
- (ii) Am împachetat [ **ce când** să iei cu tine. ]  
 have.1SG wrapped what when SUBJ take.2SG with you  
 ‘I wrapped/packed what you should take with you at the corresponding times.’

non-empty set of children for Christmas without any (functional) relation between the members of those two sets. When we try to replace and paraphrase the MEC with a DP, we need to use an indefinite DP or a bare plural, as in (41)b. In contrast, the bracketed multiple *wh*- FR in (42)a refers to the maximal individual of the set of things that grandma wrapped in order to give them to the appropriate people. In fact, in (42)b, the bracketed definite DP needs to be used to replace and roughly paraphrase the multiple *wh*- FRs in (42)a (see discussion in Sections 2.3 and 2.4).

- (41) a. Bunica are [ **ce cui** da de Crăciun.]  
 Grandma has what who.DAT give.INF for Christmas  
 ‘Grandma has things to give to people for Christmas.’  
 b. Bunica are [ **lucruri/ niște lucruri** de dat **unor copii** de Crăciun.]  
 Grandma has things some things to given some.DAT children for Christmas  
 ‘Grandma has (some) things to give to (some) people for Christmas.’
- (42) a. Bunica a împachetat [ **ce cui** dă de Crăciun.]  
 Grandma has wrapped what who.DAT gives for Christmas  
 ‘Grandma wrapped the things she’ll give to the appropriate people on Christmas.’  
 b. Bunica a împachetat [<sub>DP</sub> **lucrurile** pe care le va oferi de Crăciun.]  
 Grandma has wrapped things-the ACC REL CL will.3SG offer for Christmas  
 ‘Grandma wrapped the things that she’ll give for Christmas.’

The properties mentioned above therefore provide both syntactic and semantic arguments against an analysis of multiple *wh*- FRs as MECs.

### 3.6 Interim summary

The discussion above has highlighted several differences between multiple *wh*- FRs and other constructions involving multiple *wh*-phrases. While pointing out these differences, we also argued that multiple *wh*- FRs exhibit the following commonalities with single *wh*- FRs:

- (i) they both occur in argument position within the matrix clause;
- (ii) they are introduced by the same (non-interrogative, non-existential) matrix predicates;
- (iii) they cannot be introduced by the *wh*-phrases *cine* (‘who’) and *care NP* (‘which NP’);
- (iv) they do not carry any mood restrictions;
- (v) they are both reverential and maximal, like definite DPs.

We conclude that there is convincing syntactic and semantic evidence to distinguish the construction that we are investigating—multiple *wh*- FRs—from other kinds of multiple *wh*- clauses attested crosslinguistically, be they correlatives, interrogatives, MECs or the kind of multiple *wh*- clauses discussed by Rudin.

We would like to conclude the description of multiple *wh*- FRs in Romanian and the ways to distinguish them from other kinds of multiple *wh*- clauses by adding some further remarks,

before turning to the next section and our compositional account of the semantic properties of multiple *wh*- FRs.

In this section, we have provided a series of tests and contexts that could help set apart various multiple *wh*- constructions. The attentive reader may have noticed that we used a fairly limited number of predicates (e.g., ‘wrap’, ‘assemble’, ‘arrange’) and most of our multiple *wh*- FRs examples have *ce* ‘what’ as their first *wh*-phrase. This was a deliberate choice we made in order to make sure the predicates we used were uniquely selecting for multiple *wh*- FRs rather than allowing also any of the other *wh*-constructions we just discussed. We chose to avoid any possible ambiguity to facilitate our consultants’ judgments and make the data we report in the paper as clear and solid as possible. However, we think multiple *wh*- FRs are not necessarily restricted to these predicates and these *wh*-phrase combinations. We discuss some relevant examples in the remainder of this section.

The sentence in (43)—which contains a bracketed multiple *wh*-clause in the subjunctive in the complement position of the MEC-embedding predicate *da* ‘give’ (Šimík 2011)—is ambiguous, as we highlighted in the two translations we provided.

- (43)  $\text{\u0162i-am}$              $\text{dat}$  [ ***ce unde***  $\text{s\u0103 instalezi.}$ ]<sup>9</sup>  
 CL2-have.1SG given what where SUBJ install.2SG  
*Reading 1 (MEC):* ‘I gave you things to install somewhere.’  
*Reading 2 (FR):* ‘I gave you the things to install at their appropriate places.’

Reading 1 results from analyzing the multiple *wh*- clause as a MEC: the *wh*-word ‘what’ introduces a set of things, while the *wh*-word ‘where’ introduces a set of places and both sets are asserted to be non-empty, i.e., they are existentially quantified over. Crucially, this reading does not require the existence of a specific connection between things and places. On the other hand, the sentence in (43) can also be interpreted along the line of Reading 2, resulting from analyzing the multiple *wh*- clause as a multiple *wh*- FR: the whole embedded clause now refers to the maximal individual of the set of things that had to be installed, each at its own specific place, according to a mapping that the speaker and the hearer share. The predicates ‘find’ or ‘choose’ exhibit similar ambiguous selectional properties (see Šimík 2011), as shown in (44) with the multiple *wh*- clause in the subjunctive.

- (44)  $\text{Bunica}$      $\text{a g\u0103sit/ales}$  [ ***unde c\u00e2nd***  $\text{s\u0103 fie deschise cadourile.}$ ]  
 Grandma has found/chose where when SUBJ be open.3PL gifts-the  
*Reading 1 (MEC):* ‘Grandma found/chose some place(s) where the gifts will be open at some point in time.’  
*Reading 2 (FR):* ‘Grandma found/chose the places where the gifts will be open, each gift at its appropriate time.’

The sentence in (44) is ambiguous between the “MEC” interpretation in Reading 1, where grandma found/chose (some) places where the presents will be open at some point during the relevant period (i.e., an existential interpretation of the *wh*-words), and the “FR” interpretation

<sup>9</sup> It is also possible to have a more abstract meaning where the speaker gave a list of things (and places where the things were to be installed). Since nothing in our argumentation hinges on this, we set this interpretation aside.

in Reading 2, according to which grandma found/chose the places to have the presents opened and for each place there is a corresponding time for the gift-opening, e.g., the gifts under the tree will be open on Christmas Eve, the ones in the attic on Christmas day and the ones in the garage on New Year’s Eve. Speakers rely on the context to determine the appropriate interpretation.

Lastly, examples like (45) show that the matrix predicate ‘show’ allows for an interpretation of the bracketed multiple *wh*- clause that cannot be easily distinguished between an embedded interrogative (where the children showed both where and when the puzzle pieces must be put) and a definite, multiple *wh*- FR reading where the second *wh*-phrase has a functional interpretation, i.e., the children showed the places where the pieces had to be put and for each piece there is an appropriate time to put that piece in its place.

- (45) Copiii ne-au arătat [**unde când** trebuie puse piesele din puzzle.]  
 Children us-have.3PL showed where when must put.3PL pieces-the from puzzle  
*Reading 1 (interrogative):* ‘The children showed us where the pieces of the puzzle had to be put and when.’  
*Reading 2 (FR):* ‘The children showed us the places where the pieces of the puzzle had to be put at the time that it was appropriate for each piece.’

These examples show that *multiple wh*- constructions of various kinds are very productive in Romanian and the differences among these constructions are not always easily detectable. We have presented various tests and contexts that can be used to properly identify clear cases of multiple *wh*- FRs, but we are aware of the existence of less clear-cut cases. To minimize ambiguity, we have focused on examples of multiple *wh*- FRs that occur as arguments of non-interrogative and non-existential predicates, are only in the indicative mood, and are headed by *ce* ‘what’.

Taking stock, we have seen that multiple *wh*- FRs behave in all relevant respects like single *wh*- FRs: they have the same distribution and, as we will discuss in detail in the following section, they have the same overall meaning. The question then becomes what the interpretation of multiple *wh*- FRs is and how it is derived by a compositional procedure resembling the one used by single *wh*- FRs.

#### 4 Semantic analysis of multiple *wh*- FRs

In this section, we develop a compositional semantic analysis for multiple *wh*- FRs by further developing well-established semantic analyses of single *wh*- FRs. First, we show the limits these analyses face when they are extended to multiple *wh*- FRs. Then, we propose an analysis that overcomes those limits by broadening the semantic contribution of *wh*-phrases in FRs.

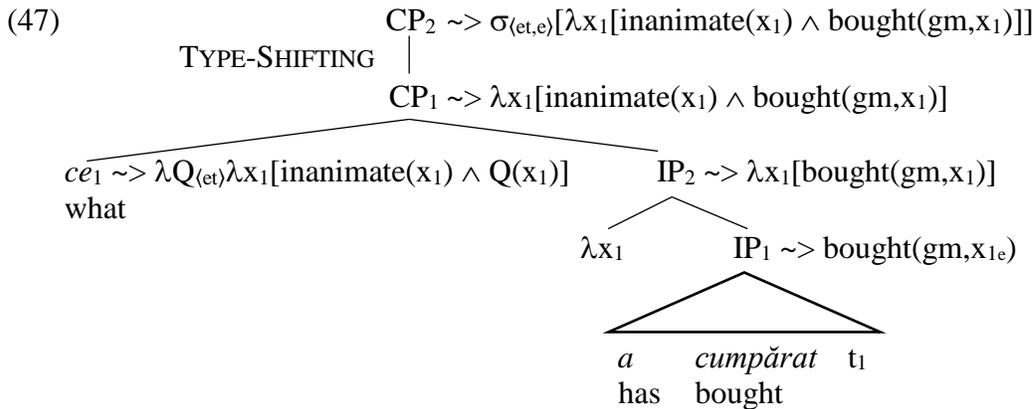
##### 4.1 Semantics of single *wh*- FRs

The main idea behind well-established semantic analyses of single *wh*- FRs—details aside—is that their *wh*-phrase licenses a trace/variable over individuals over which lambda-abstraction applies, producing a set of individuals. A silent maximality operator or a type-shifting operation applies to this set returning the unique maximal member of the set (Jacobson 1995; Dayal 1996;

Caponigro 2003, 2004). This analysis for FRs is based on what has been argued for definite descriptions (e.g., Link 1983). Let us look at the details of this approach by considering a specific example.

The sentence in (46) contains a bracketed single *wh*- FR, while (47) gives the crucial steps of the semantic derivation of the FR according to the approach just mentioned. Comments follow.

- (46) Bunica a împachetat [ **ce** a cumpărat azi. ]  
 Grandma has wrapped what has bought today  
 ‘Grandma wrapped what she bought today.’



In (47), the *wh*-phrase leaves a trace  $t_1$  in its base-generated position, which translates into a variable over individuals  $x_1$  (type  $e$ ).  $\text{IP}_2$  ends up denoting a set of individuals (type  $\langle et \rangle$ ) by lambda-abstraction over  $x_1$ : the set of all the singular and plural individuals that grandma ( $gm$ ) bought up to its unique maximal individual (i.e., the individual resulting from the sum of all the atomic individuals in the set). The *wh*-phrase syntactically combines with  $\text{IP}_2$ , while semantically it acts as a set restrictor (type  $\langle et, et \rangle$ ): it applies to the set  $\text{IP}_2$  denotes and returns the subset of all the non-human singular or plural individuals that grandma bought as the denotation of  $\text{CP}_1$  (type  $\langle et \rangle$ ). Finally, a default type-shifting operation applies, where the set  $\text{CP}_1$  denotes is converted into its maximal individual (type  $e$ ) via the maximality operator  $\sigma$ , which has been argued to be the semantic contribution of the definite determiner *the* in English and similar languages (Link 1983). Notice that such an operation from a set to its maximal individual is information-preserving: it is always possible to construct the unique maximal individual of a finite set of atomic individuals (and all the plural individuals that can be formed out of the atomic ones) and it is always possible to reconstruct a set of atomic individuals (and all the plural individuals that can be formed out of the atomic ones) from its maximal individual.

Summarizing, this analysis of single *wh*- FRs accounts for their behavior as definite descriptions by assuming a silent version of the definite operator that applies by default, which crucially relies on a set of individuals resulting from abstracting over a variable over individuals. This is the same variable that *wh*-phrases in *wh*- interrogative clauses license. The meaning that is assumed for *wh*-phrases in single *wh*- FRs (48) is close, but not identical, to the meaning that is assigned to *wh*-phrases in common analyses of *wh*- interrogative clauses (49) (Karttunen 1977):

$$(48) \text{ WH}_{\text{FR}} \rightsquigarrow \lambda Q \lambda x [\text{WH}(x) \wedge Q(x)]$$

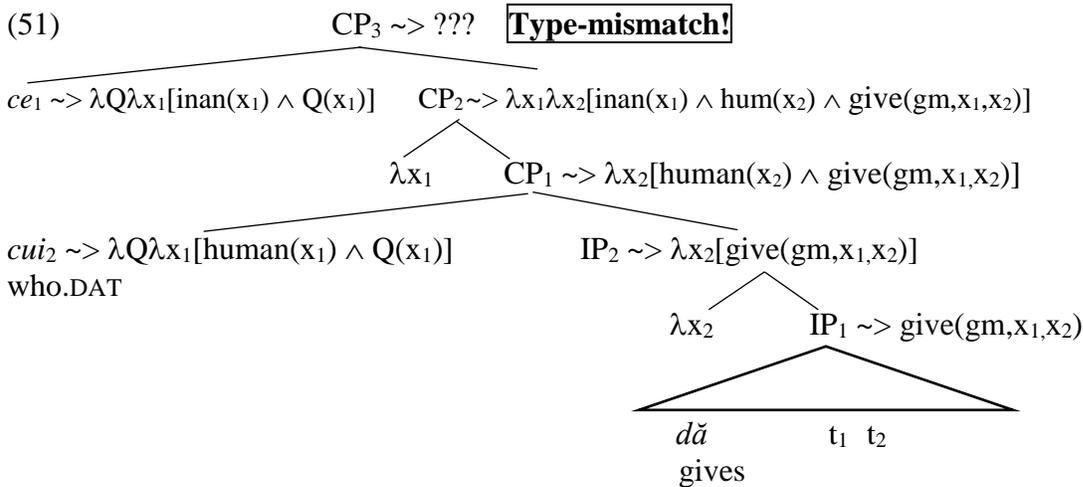
$$(49) \text{ WH}_{\text{INT}} \rightsquigarrow \lambda Q \exists x [\text{WH}(x) \wedge Q(x)]$$

According to (49), a *wh*-phrase in an interrogative clause ( $\text{WH}_{\text{INT}}$ ) behaves exactly like an existential generalized quantifier: for instance, *who* means exactly the same thing as *someone*. As we just saw, the existential quantification over the variable licensed by the *wh*-phrase in a *wh*-interrogative clause is replaced by lambda-abstraction over the variable translating the *wh*-trace in a FR (48). The one-place predicate *wh* in (48) and (49) stands for whatever semantic restriction the *wh*-phrase carries (human for ‘who’, inanimate for ‘what’, location for ‘where’, etc.).

#### 4.2 Problems with extending the semantics of single *wh*- FRs to multiple *wh*- FRs

The approach in Section 4.1 cannot be straightforwardly applied to multiple *wh*- FRs. Let us briefly see why with an example, such as (50), which contains a multiple *wh*- FR in brackets. (51) attempts to provide a semantic derivation for the bracketed FR in (50) by assuming that all *wh*-phrases license traces translating into variables over individuals and restricts sets of individuals.

- (50) Bunica a împachetat [ **ce** **cui**      **dă**      **de** Crăciun. ]  
 Grandma has wrapped      what who.DAT gives      for Christmas  
 ‘Grandma wrapped what she will give to the appropriate people for Christmas.’



The translation of  $\text{CP}_1$  in (51), i.e., the CP containing only the lowest *wh*-phrase and the remainder of the FR, is the usual set of individuals, in particular, the set of individuals grandma gives a certain object  $x_1$  to. Problems arise with the next step. As usual, before a *wh*-phrase can combine with the remainder of its clause, lambda-abstraction over the variable that is coindexed with the *wh*-word has to apply. Abstracting over  $x_1$  produces the denotation of  $\text{CP}_2$ : a function from an inanimate individual  $x_1$  to a set of human individuals  $x_2$  such that grandma gives  $x_1$  to

$x_2$ —a semantic object of type  $\langle e, et \rangle$ . On the other hand, the sister of  $CP_2$  is a *wh*-word that semantically behaves like a set restrictor (type  $\langle et, et \rangle$ ). No function application can apply, nor any other known semantic rule. Therefore,  $CP_3$  ends up without a denotation and the semantic derivation crashes. Even if we assumed an *ad hoc* semantic rule to combine the two meanings, it would not return the correct meaning for  $CP_3$  and the whole FR. The semantic analysis we just tried to pursue treats each *wh*-expression as semantically independent from any other *wh*-expression in the same clause. This clashes with speakers' intuitions, according to which the meaning of the lowest *wh*-phrase “depends” on the meaning of the highest *wh*-phrase, as we showed in Section 2.4. In conclusion, a simple extension of existing analyses of single *wh*-FRs to multiple *wh*-FRs is both formally and empirically problematic.

### 4.3 Proposal: the semantics of multiple *wh*-FRs by means of complex traces and functional *wh*-phrases

To overcome the problems in the analysis we discussed in the previous section, we propose two changes that broaden the available meaning inventory for *wh*-phrases in FRs. First, we assume that the first/left-most *wh*-phrase in a FR, i.e., the *wh*-phrase that c-commands the other in a multiple *wh*-FR, licenses a standard *wh*-trace—a familiar variable over individuals. This is the same denotation for *wh*-phrases we assumed in a single *wh*-FR. It is repeated in (52)a. The other *wh*-phrase, instead, licenses a complex trace translating into the complex functional variable in (52)b, which is made of a variable over Skolem functions ( $f_2$ , type  $\langle e, e \rangle$ ) taking a variable over individuals ( $x_1$ , type  $e$ ) as its argument and returning an individual (type  $e$ ) as its value.

- (52) a. Simple *wh*-trace:  $t_1 \sim x_1$   
 b. Complex *wh*-trace:  $t_2^1 \sim f_2(x_1)$

In the end, both traces/variables in (52) denote individuals, but, while the simple *wh*-trace does so through a direct assignment of an individual by the assignment function, the complex *wh*-trace denotes an individual through the interplay of a variable over Skolem functions and a variable over individuals acting as the argument of the function. The individual variable that occurs as the argument of the Skolem function is coindexed with a higher *wh*-phrase—a feature that plays a crucial role in the semantic composition, as we discuss below.

Our second change is strictly related to the first one and has to do with the actual denotation of *wh*-phrases. We summarize it in (53)a-b. Comments follow.

- (53) a. Individual  $WH_{FR} \sim \lambda Q \lambda x [WH(x) \wedge Q(x)]$   
 b. Functional  $WH_{FR} \sim \lambda F \exists f [WH(f) \wedge F(f) \wedge U(f)]$

*Abbreviations:*

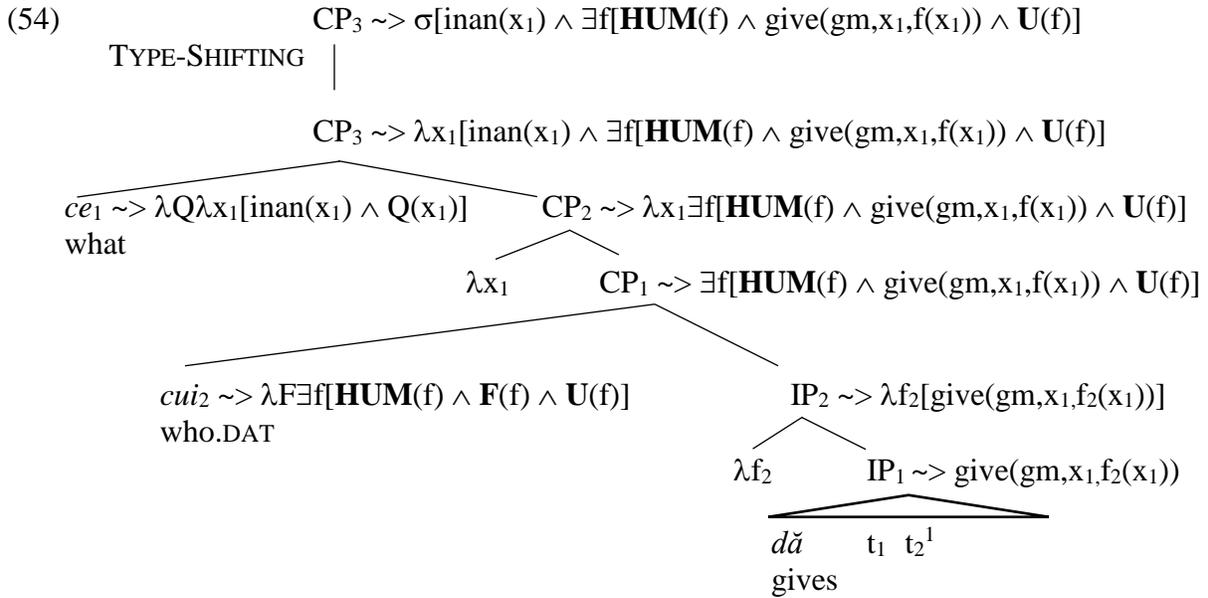
$WH(f): \forall x [wh(f(x))]$

$U(f): \forall f^* [\forall x [wh(f^*(x))] \wedge F(f^*)] \rightarrow f^*=f]$

The denotation in (53)a is the one that has been proposed for *wh*-phrases in single *wh*-FRs like those we discussed in Section 4.1. A *wh*-phrase licensing the trace over individuals in (52)a

semantically behaves like a set restrictor: it applies to a set of individuals to return a subset. This is why we labelled it *Individual WH<sub>FR</sub>*. The denotation in (53)b, instead, is new and we are proposing it for a *Functional WH<sub>FR</sub>*—a *wh*-phrase licensing the complex *wh*-trace in (52)b. A Functional WH<sub>FR</sub> denotes a function that applies to a set of Skolem functions  $F$  (type  $\langle e, t \rangle$ ) and returns true if there is a Skolem function  $f$  (type  $\langle e, e \rangle$ ) satisfying the following three conditions: (i)  $f$  is one of the functions in  $F$ , as required by the formula  $F(f)$  in (53)b, (ii)  $f$  outputs values that satisfy the restriction carried by the *wh*-phrase like *human*, *inanimate*, *place*, etc., as imposed by the formula  $WH(f)$  in (53)b, and (iii)  $f$  is unique, as expressed by the formula  $U(f)$  in (53)b. This new denotation for *wh*-phrases is reminiscent of the Russellian denotation of definite descriptions—the main difference being that our proposed denotation for a Functional WH<sub>FR</sub> quantifies over sets of Skolem functions rather than individuals (besides carrying a further restriction due to the semantic features on *wh*-phrases).

We further discuss and bring independent evidence to these two assumptions in Section 4.4. First, we want to show how, with these two assumptions in hand, we can overcome the issues that prevented the semantic derivation of (50) in (51) from going through. Let us then examine the new semantic derivation in (54).



Starting from the bottom in (54), lambda-abstraction applies to the variable  $f_2$  over Skolem functions in the logical translation of IP<sub>1</sub>—the variable that, together with its argument variable  $x_1$ , is licensed by the lower *wh*-word *cui<sub>2</sub>* as the logical translation of its trace  $t_2^1$ . As a result, IP<sub>2</sub> ends up denoting the set of all Skolem functions such that grandma gives the individual  $x_1$  to the individual that  $f_2$  associates to  $x_1$ . The lower *wh*-word *cui<sub>2</sub>* no longer denotes a set restrictor, as in (51), but an existential quantifier that applies to a set  $F$  of Skolem functions and returns true if there is a unique function in  $F$  that outputs people (human individuals). Therefore, the combination of *cui<sub>2</sub>* and its sister IP<sub>2</sub> results in CP<sub>1</sub> denoting true iff there is one and only Skolem function  $f$  that outputs people such that grandma gives an individual  $x_1$  to the person that  $f$  associates to  $x_1$ . The next step is the lambda-abstraction that is necessary before the higher

*wh*-word  $ce_1$  can combine. The abstraction applies to all the instances of  $x_I$ —the variable that is coindexed with  $ce_1$  in  $CP_1$ . The result is that  $CP_2$  denotes a set of individuals  $x_I$  that grandma gives to the people that are associated to the individuals  $x_I$  according to a unique Skolem function  $f$ . This is the set the higher *wh*-phrase  $ce_1$  applies to and restricts to the subset of objects (inanimate individuals), returning the denotation of  $CP_3$ . Finally, the familiar type-shifting operation from single *wh*-FRs (see (47) and related discussion) can apply here as well, returning the maximal individual the multiple *wh*-FR refers to. In this way, the multiple *wh*-FR in (54) ends up denoting the unique maximal individual of the set of objects  $x_I$  that grandma gives to the people associated with  $x_I$  according to the unique Skolem function  $f$  from (animate/inanimate) individuals to people. This final denotation captures speakers' intuitions and the semantic properties we discussed in Section 2.

A welcome prediction of our proposal is the one schematized in (55):  $wh_2$ , the *wh*-phrase that is c-commanded by the other ( $wh_1$ ), has to receive a functional interpretation and, therefore, has to license a complex *wh*-trace. Any other meaning combination of *wh*-phrases would make the semantic derivation crash (essentially for the same reasons we discussed in Section 4.2).

(55) [FR WH<sub>FR-1</sub> Functional/\*Individual WH<sub>FR-2</sub> ... t<sub>1</sub> ... t<sub>2</sub><sup>1</sup> ... ]

This prediction matches speakers' intuitions according to which the interpretation of the highest *wh*-phrase “functionally” affects the interpretation of the other *wh*-phrase, as we discussed in Section 2.4.

#### 4.4 Further support to the two core assumptions

The analysis of multiple *wh*-FRs we just presented crucially relies on two core assumptions about the semantic nature of *wh*-traces/variables and *wh*-phrases, at least in FRs in Romanian. We elaborated on and made use of those assumptions in the previous section. In this section, we provide further support to both by briefly touching on related proposals.

We assumed that a *wh*-phrase can license a familiar simple mono-indexed trace translating into a variable over individuals ((52)a) or, crucially, a complex trace carrying two indices that are associated to two different antecedents—one of which is the *wh*-phrase itself—and translating into a variable over Skolem function taking a variable over individuals ((52)b). The latter kind of trace/variable has been argued to be licensed in other constructions as well. Complex traces/variables were initially suggested to account for functional readings of single *wh*-interrogative clauses with universal quantifiers (Engdahl 1980, 1986; Chierchia 1991, 1993; Dayal 1996). For instance, the single *wh*-interrogative clause in (56)a allows for an answer like *His mother* (56)b, which doesn't refer to any individual in particular but rather to the function mapping every Italian male to a specific and unique female.

- (56) a. QUESTION: [Which woman]<sub>2</sub> does [every Italian man]<sub>1</sub> love **t<sub>2</sub><sup>1</sup>** the most?  
 b. ANSWER: His mother.

This approach was subsequently extended to account for headed relative clauses with a universal quantifier like (57) by assuming that their possibly null *wh*- operator ( $Op_2$ ) licenses a functional trace (Sharvit 1999a).<sup>10</sup>

(57) [The picture of herself]<sub>2</sub> [Op<sub>2</sub> that [every famous actress]<sub>1</sub> hated  $t_2^1$ ] sold for a lot.<sup>11</sup>

Furthermore, Sharvit (1999b) argues that single *wh*- FRs with universal quantifiers in the subject position of predicational copular sentences like (58) also contain a functional trace licensed by the *wh*-phrase introducing the FR.

(58) [What<sub>2</sub> [every student]<sub>1</sub> got  $t_2^1$ ] was a nuisance to him.<sup>12</sup>

To this, we can add the fact that multiple *wh*- interrogative clauses have also been argued to license functional traces (e.g., Comorovski 1996; Dayal 1996: 117-118, 2016: 112-115). A multiple *wh*- interrogative clause like the one in (59)a receiving a functional answer like (59)b (both adapted from Comorovski 1996: 51, ex. 95) would license a functional trace at LF, as shown in (59)c.

(59) a. QUESTION: Which student got back which paper?  
 b. ANSWER: Every student got back their syntax paper.  
 c. LF of a.: [[which paper]<sub>2</sub> [[which student]<sub>1</sub> [  $t_1$  got back  $t_2^1$ ]]]

Finally, multiple *wh*- correlative clauses are another *wh*- construction for which functional traces have been invoked (Dayal 1996: 200-202). Adapting Dayal's analysis to Romanian (see also Brașoveanu 2012: 41), the higher *wh*-phrase in the multiple *wh*- correlative clause in (60) licenses an individual trace, while the lower *wh*-phrase licenses a functional trace—the same pattern we have argued for multiple *wh*- FRs.

(60) [Cine<sub>1</sub> [ce mâncare]<sub>2</sub>  $t_1$  și-a adus  $t_2^1$ ], pe aceea o  
 who what food REFL.DAT-has brought ACC DEM it.ACC  
 va mânca.  
 will.3SG eat  
 'Everyone will eat whatever food they brought with them.'

In conclusion, our core assumption that *wh*-phrases can license complex traces/variables is independently supported by proposals that have been made for several different constructions in different languages.

<sup>10</sup> To the best of our knowledge, Jacobson (1994) is the first to recognize the functional nature of these headed relative clauses. She discusses examples like (i) below and proposes a functional analysis within her variable-free framework, which is grounded within Categorical Grammar and does not make use of *wh*-movement (or any syntactic movement) nor traces/variables.

(i) The woman who every Englishman<sub>i</sub> admires (the most) is his<sub>i</sub> mother. (Jacobson 1991: ex. 2a)

<sup>11</sup> Adapted from Sharvit (1999a: ex. 8a).

<sup>12</sup> Adapted from Sharvit (1999b: ex. 92).

The second assumption at the center of our proposal is that a *wh*-phrase in a FR in Romanian exhibits a dual semantic behavior: as Individual  $WH_{FR}$ , they denote a set restrictor over sets of individuals ((53)a), while, as Functional  $WH_{FR}$ , they denote an existential quantifier over a set of Skolem functions ((53)b). In (61), we repeat the denotation of Functional  $WH_{FR}$  in order to more easily compare them with the denotation in (62), which has been proposed for Functional  $WH_{INT}$ —*wh*-phrases in interrogative clauses that receive a functional interpretation, like the one we discussed in (56) (Engdahl 1986; Chierchia 1991; Dayal 1996).

(61) Functional  $WH_{FR} \sim \lambda F \exists f [ \mathbf{WH}(f) \wedge \mathbf{F}(f) \wedge \mathbf{U}(f) ]$

(62) Functional  $WH_{INT} \sim \lambda F \exists f_2 [ \mathbf{WH}(f_2) \wedge \mathbf{F}(f_2) ]$

The only difference between the two denotations is that the denotation for the Functional  $WH_{FR}$  includes an extra restriction: the uniqueness of the relevant Skolem function. In the remainder of this section, we provide empirical evidence in favor of this restriction. Section 2 already provided evidence supporting other features of our proposal about *wh*-phrases.

Example (63) repeats our first example in (1) for convenience.

(63) Bunica a împachetat [**ce cui**      dă      de Crăciun.]  
 Grandma has wrapped    what who.DAT gives    for Christmas  
 ‘Grandma wrapped the things she’ll give to the appropriate people on Christmas.’

According to our analysis, the bracketed multiple *wh*- FR in (63) denotes the maximal plural entity of a set of things, each of which is associated with a corresponding person, who will be given one of those things for Christmas. This closely matches speakers’ intuitions, as we discussed in Section 2. The denotation for the Functional  $WH_{FR}$  in (61) requires the existence of at least one appropriate Skolem function. In fact, when the context makes it hard or impossible to find one, the whole sentence containing the relevant multiple *wh*- FR sounds infelicitous, as shown in (64).

(64) # Bunica a împachetat [**ce cui**      dă      de ziua      lui Andrei.]  
 Grandma has wrapped    what who.DAT gives for birthday of Andrei  
 ‘Grandma wrapped the things she’ll give to the appropriate people on Andrei’s birthday.’

The example in (64) is minimally but crucially different from the fully felicitous example in (63). What makes (64) odd is the fact that typically for a given birthday, there aren’t multiple gift-receivers. So, there’s no appropriate Skolem function mapping gifts to gift-receivers. Notice that we are excluding the extreme case of a Skolem function whose domain contains just one individual (i.e., Andrei) and whose range is a singleton as well (i.e., Andrei’s gift). The ban on such Skolem functions may receive a pragmatic explanation: why would the speaker use a functional dependency in (64) when she could just utter the bracketed single *wh*- FR in (65) or the even simpler bracketed DP in (66).

(65) Bunica a împachetat [**ce** îi dă lui Andrei de ziua lui. ]  
 Grandma has wrapped what CL.DAT gives to Andrei for birthday his  
 ‘Grandma wrapped the thing she will give Andrei for his birthday.’

(66) Bunica a împachetat [**cadoul** de ziua lui Andrei. ]  
 Grandma has wrapped present-the for birthday of Andrei  
 ‘Grandma wrapped Andrei’s birthday gift.’

(64) would be acceptable only in a context where, for some reason, grandma decided to give things to people on a particular day, which happens to be Andrei’s birthday, and had some way to establish which gift goes to which person.

Multiple *wh*- FRs with negation illustrate a similar point, as shown in (67).

(67) # Bunica a împachetat [**ce** **cui** nu dă de Crăciun. ]  
 Grandma has wrapped what who.DAT not gives for Christmas  
 ‘Grandma wrapped the things she will not give to the appropriate people on Christmas.’

(67) is infelicitous. The reason is that there is no natural Skolem function that associates wrapped objects to people to whom the objects are *not* given. The presence of negation makes a natural mapping from objects to individuals unavailable. Note, however, that it is perfectly natural to refer to the set of things grandma will not give for Christmas, which is why the single *wh*- FR in (68) is felicitous and can be used, for example, in a context where grandma wrapped things she bought for Christmas but decided not to offer anymore. It is therefore the presence of the second *wh*-word (and the need for an appropriate functional dependency) that makes (67) infelicitous.

(68) Bunica a împachetat [**ce** nu dă de Crăciun.]  
 Grandma has wrapped what not gives for Christmas  
 ‘Grandma wrapped the things she will not give for Christmas.’

The evidence we just presented argues in favor of existential quantification over Skolem functions as part of the denotation for *wh*-phrases. We now turn to the evidence supporting the uniqueness requirement.

Let’s imagine a context that makes it clear that there may be more than one relevant Skolem function, due, for instance, to epistemic uncertainty on the part of the agent. Grandma bought Christmas presents for the family. She knows well her two sons and their wishes this year, so she bought a book for Paul and a coffee machine for Ryan. She also has a few toys (a board game, a remote-control car, a science set) for her three grandchildren, but she wants to check with the parents before deciding who receives each toy. In this context, the very same sentence in (63) becomes infelicitous and the reason is because grandma hasn’t made decisions yet about the receivers for some of her gifts, which implies that more than one relevant Skolem function from gifts to people is available in the given situation.

Notice that speakers don't need to be familiar with the relevant unique Skolem function. They can utter (63) felicitously even if they don't know what appropriate mapping grandma has in mind as long as they know she has one, and only one.<sup>13,14</sup>

Lastly, we observe that a multiple *wh*- FR like (63) is fine in the scenario in which grandma gives each grandchild and each child a gift and, if a child has a significant other, then the child's gift is actually a gift to the couple as a whole. In other words, we are dealing with a mapping from atomic gifts to atomic or plural human individuals. Our proposal can handle this fact by allowing the range of a Skolem function to include plural individuals as well. It is also possible to utter (63) felicitously in a scenario in which more than one object is given as a gift to one or more individuals. For instance, if grandma gives two gifts to each grandchild that has received all A's at school. Once again, we can accommodate this scenario by allowing the domain of the relevant Skolem function to include plural individuals as well.<sup>15</sup>

The move to allow for plural individuals in the domain and range of Skolem functions is not unconstrained. It is only justified when the plural individuals form a natural unit in the given context. In the scenarios above, one of grandma's children and their partner do form a natural unit, which is even lexicalized by nominals like *couple*. Similarly, it is fairly easy to imagine a gift as made of more than one component. On the other hand, there are cases where a plural object is not granted and the sentence with a multiple *wh*- FR sounds infelicitous. For instance, let's consider a scenario in which a stage manager is in charge of carefully arranging, in boxes that are backstage, the objects that will be put by the actors in different places on the stage during the performance. Crucially, for several objects it will be the case that each of them will be put in different places at different times during the performance. For instance, suppose a special precious book will be put on the coffee table in Act 1 and then back in the bookcase in Act 2. Similarly, a plate will be on the main table in Act 2 and then on the floor in Act 3. The coffee table and the bookcase are two independent places, the same for the main table and the floor. So we are in a situation in which there are at least two objects, each of which is mapped to two independent and unrelated places. In this situation, (69) is infelicitous and speakers comment that this is the case because there is no singular or plural place each object can be mapped to, since at least two objects are associated with two places.

- (69) # În culise, directorul de scenă a aranjat [ce unde trebuia pus în timpul  
in backstage manager-the of stage has arranged what where needed put in time-the  
spectacolului.]  
show-the.GEN  
'Backstage, the stage manager arranged the things that needed to be put in their  
appropriate places during the performance.'

<sup>13</sup> The uniqueness requirement for definite description works the same when disjointed from familiarity: *Grandma already bought the birthday gift for her only son* doesn't require the speaker to know what grandma bought in order to be uttered felicitously.

<sup>14</sup> At a preliminary stage of our investigation, we had overlooked facts like this one and suggested an analysis according to which a Functional  $WH_{FR}$  introduces an unbound Skolem function that is contextually salient to the speaker as well (Caponigro & Fălăuș 2018).

<sup>15</sup> Thanks to Adrian Brașoveanu for making us think about these kinds of examples and contexts.

The discussion in this section offered further support in favor of our proposal about the existence of a Functional  $WH_{FR}$  in (61). This new denotation for *wh*-phrases is what is crucially needed—we have argued—to both capture speakers’ intuitions about how the meaning of the two *wh*-phrases interacts and provide a fully compositional semantic analysis of multiple *wh*-FRs that is faithful to those intuitions.

## 5 Conclusions

In this paper, we have started unveiling a previously ignored multiple *wh*- construction: multiple *wh*- FRs. We have shown that they exist and are productive—at least in the variety of Romanian spoken in Transylvania. We have compared them to and distinguished them from the other kinds of multiple *wh*- clauses that are attested in the language—interrogative clauses, correlative clauses, Rudin’s sentences, and MECs. We have argued that multiple *wh*- FRs are FRs and their basic semantics is the same as the one of single *wh*- FRs: both FRs are referential and maximal. We have proposed a compositional semantic analysis for multiple *wh*- FRs that builds on two main components: (i) the assumption that *wh*-phrases can license complex functional traces/variables, which has been independently argued for several other *wh*- constructions, and (ii) a new functional meaning for *wh*-phrases, which is essentially a variant of the functional meaning of *wh*-phrases that has been independently proposed to account for functional *wh*- interrogative clauses.

Finally, we showed in (6)–(9) that multiple *wh*- FRs are attested in at least four more languages (or varieties thereof). These findings do not stem from a systematic cross-linguistic investigation, but simply from feedback we received by presenting our work at different audiences. We hope that our paper will foster research on multiple *wh*- FRs by providing a clear case from Romanian, analytical tools and tests to identify them and distinguish them from other *wh*- constructions, as well as an analysis to account for their main properties. We are confident that other languages will turn out to have multiple *wh*- FRs. On the other hand, it is incontrovertible that multiple *wh*- FRs are less common across languages, which is probably a reason why they have been almost completely neglected so far. Even within our limited investigation, it is clear that languages that have both single *wh*- FRs and multiple *wh*- interrogative clauses do not necessarily have multiple *wh*- FRs. Most varieties of American and Canadian English we are aware of do not allow for multiple *wh*- FRs, nor do most varieties of German we have checked. Also, we have not found any variety of Spanish or French that allows for multiple *wh*- FRs. Although we do not have an explanation for this restriction, we would like to offer some speculations.

Functional  $WH_{FR}$  as defined in (61) require two major changes from their most likely lexical source—Functional  $WH_{INT}$  as defined in (62). First, the uniqueness requirement needs to be added to the denotation of Functional  $WH_{FR}$ . This is a semantic change that imposes further restrictions on the use of this kind of *wh*- item: the existence of one, and only one, relevant Skolem function in the given context. Second, Functional  $WH_{FR}$  have to be licensed in a non-interrogative clause—a syntactic change. Notice that the semantic change is different and independent from the semantic change from the denotation of Individual  $WH_{INT}$  as generalized quantifiers, as defined in (49), to the denotation of Individual  $WH_{FR}$  as set restrictors, as defined in (48). This semantic change does not impose further restrictions on the *wh*- items, but it actually “weakens” their meaning, by eliminating the assertion of existence. As a result of all

this, we predict the existence of languages that allow for the semantic change from Individual WH<sub>INT</sub> to Individual WH<sub>FR</sub> without necessarily allowing the semantic change from Functional WH<sub>INT</sub> to Functional WH<sub>FR</sub>. In other words, we predict the existence of languages with single *wh*- FRs but no multiple *wh*- FRs. On the other hand, we do not predict the reverse pattern—languages with multiple *wh*- FRs but no single *wh*- FRs—since the first/highest *wh*-phrase in a multiple *wh*- FR cannot be functional in multiple *wh*- FRs like the one in (50), as made it clear by its semantic derivation in (54). These predictions seem to be borne out, although our cross-linguistic evidence is still very limited and tentative. We hope that our paper will help filling in this gap by encouraging further investigation on multiple *wh*- FRs in Romanian and across languages.

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To be added

## References

- Brașoveanu, Adrian. 2008. Uniqueness effects in correlatives. In Alte Grønn (ed.), *Proceedings of Sinn und Bedeutung* 12, 47–65. Oslo, Norway.
- Brașoveanu, Adrian. 2012. Correlatives, *Language and Linguistics Compass* 6: 1–20.
- Caponigro, Ivano. 2003. *Free not to ask: On the semantics of Free Relatives and wh-words cross-linguistically*, PhD dissertation, UCLA.
- Caponigro, Ivano. 2004. The semantic contribution of *wh*-words and type shifts: Evidence from Free Relatives cross-linguistically. In Robert B. Young (ed.), *Proceedings of Semantics and Linguistic Theory (SALT) XIV*, 38–55. CLC Publications.
- Caponigro, Ivano & Anamaria Fălăuș. 2017. Free choice free relatives in Italian and Romanian. *Natural Language and Linguistic Theory* 36 (2): 323-363.
- Caponigro, Ivano & Anamaria Fălăuș. 2018. The functional nature of Multiple *wh*- Free Relative Clauses. In S. Maspong, B. Stefansdottir, K. Blake, & F. Davis (eds.), *Proceedings of Semantics and Linguistic Theory (SALT) 28*, 566-583.
- Chierchia, Gennaro. 1991. Functional WH and weak crossover. In D. Bates (ed.), *Proceedings of the West Coast Conference on Formal Linguistics (WCCFL 10)*. Stanford, CA: CSLI, 75–90.
- Chierchia, Gennaro. 1993. Questions with quantifiers. *Natural Language Semantics* 1. 181–234.
- Citko, Barbara. 2009. What don't *wh*-questions, free relatives, and correlatives have in common?. In Anikó Lipták (ed.), *Correlatives cross-linguistically*, 49–80. Amsterdam:

- John Benjamins.
- Ćitko, Barbara & Martina Gračanin-Yukseš. 2016. Multiple (coordinated) (free) relatives. *Natural Language and Linguistic Theory* 34(2): 393–427.
- Comorovski, Ileana. 1996. *Interrogative Phrases and the Syntax–Semantics Interface*. Dordrecht: Kluwer.
- Dayal, Veneeta. 1996. *Locality in WH Quantification: Questions and Relative Clauses in Hindi*. Dordrecht: Kluwer.
- Dayal, Veneeta. 2016. *Questions*. Oxford: Oxford University Press.
- Dimova, Elena & Christine Tellier. 2018. Bulgarian Multiple Wh Relatives Revisited. In Steven L. Franks, Vrinda Chidambaram, Brian D. Joseph & Iliyana Krapova (eds.), *Katerino Mome: Studies in Bulgarian Morphosyntax in Honor of Catherine Rudin*. Bloomington: Slavica Publishers
- Engdahl, Elisabet. 1980. *The syntax and semantics of questions in Swedish*, PhD dissertation, UMass Amherst.
- Engdahl, Elisabet. 1986. *Constituent Questions: The Syntax and Semantics of Questions with Special Reference to Swedish*. Dordrecht: Reidel.
- Gajewski, Jon. 2008. On the semantics of Hindi-Urdu multiple correlatives. *Linguistic Inquiry* 39: 327–334.
- Groenendijk, Jeroen & Martin Stokhof. 1984. *Studies on the semantics of questions and the pragmatics of answers*. PhD dissertation, Universiteit van Amsterdam.
- Grosu, Alexander. 2003. A unified theory of ‘standard’ and ‘transparent’ free relatives. *Natural Language and Linguistic Theory* 21: 247–331.
- Grosu, Alexander. 2004. The syntax-semantics of modal existential *wh* constructions, in *Balkan syntax and semantics*, 405–438. Amsterdam: John Benjamins.
- Grosu, Alexander. 2013. Relative Clause Constructions and unbounded dependencies. In Carmen Sorin & Ion Giurgea (eds.), *A Reference Grammar of Romanian*, 597–662. Amsterdam: John Benjamins.
- Jacobson, Pauline. 1994. ‘Binding Connectivity in Copular Sentences’, in M. Harvey and L. Santelmann (eds.), *Proceedings of SALT IV*, Cornell University, Ithaca, pp. 161–178.
- Jacobson, Pauline. 1995. On the quantificational force of English free relatives. In Emmon Bach, Eloise Jelinek, Angelika Kratzer & Barbara Partee (eds.), *Quantification in natural languages*, 451–486. Dordrecht: Kluwer.
- Karttunen, Lauri. 1977. Syntax and semantics of questions. *Linguistics and Philosophy* 1(1): 3–44.
- Link, Godehard. 1983. The logical analysis of plurals and mass terms: A lattice- theoretical approach. In Rainer Bauerle, Christoph Schwarze & Arnim von Stechow (eds.), *Meaning, Use and the Interpretation of Language*, 303–323. Berlin: Walter de Gruyter.
- Lipták, Anikó. 2009. *Correlatives Cross-linguistically*. Amsterdam: John Benjamins.
- Patterson, Gary & Ivano Caponigro. The puzzling degraded status of *who* free relative clauses in English. *English Language and Linguistics* 20(2): 341–352.
- Rațiu, Dafina. 2011. *De la syntaxe à la sémantique des propositions interrogatives. Étude comparative des questions multiples en roumain*. PhD dissertation, University of Nantes.
- Rudin, Catherine. 1986. *Aspects of Bulgarian Syntax: Complementizers and Wh Constructions*. Columbus: Slavica Publishers.

- Rudin, Catherine. 2007. Multiple *wh*-relatives in Slavic. In Richard Compton, Magdalena Goledzinowska & Ulyana Savchenko (eds.), *Formal approaches to Slavic linguistics*, 282–307. Michigan: Michigan Slavic Publications.
- Rudin, Catherine. 2008. Pair-list vs. single pair readings in multiple *wh* free relatives and correlatives. *Kansas Working Papers in Linguistics* 30: 257–267.
- Šimík, Radek. 2011. *Modal existential wh-constructions*, PhD dissertation, University of Groningen.
- Sharvit, Yael. 1999a. Functional Relative Clauses, *Linguistics and Philosophy* 22: 447–478.
- Sharvit, Yael 1999b. Connectivity in Specificational Sentences, *Natural Language Semantics* 7: 299–339.