The functional nature of Multiple Wh- Free Relative Clauses in Romanian

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1. The puzzle. Multiple wh-words constructions are well-attested across languages: in addition to widespread multiple wh-interrogative clauses (see e.g., Dayal 2016 for a recent overview), there are languages that also allow for multiple wh-correlative clauses (e.g., Dayal 1996, Citko 2009, Lipták 2009) or multiple wh-"modal existential constructions (MECs)" (e.g., Grosu 2004, Šimík 2011). In contrast, only a few languages, mostly spoken in the Balkans (Bulgarian, Macedonian, Romanian), have been noted to have **multiple wh- free relatives clauses** (henceforth, ***multiple wh- FRs***) (Rudin 2007, 2008). Examples of multiple wh- FRs in Romanian with two and three wh-words are given in brackets in (1) and (2), respectively.

(1) Am   împachetat [ce   cui   dăm   de Crăciun].
       have.1 wrapped   what who.DAT give.1PL for Christmas
       Roughly: 'We wrapped the things to give to the appropriate people on Christmas.'

(2) Ţi-am   dat [ce   unde când a   trebuit instalat].
       CL2-have.1SG given   what where when has needed installed
       Roughly: 'I have you the things that needed to be installed in the appropriate place at the appropriate time.'

Multiple wh- FRs not only have been much less studied, but are also particularly puzzling. They are FRs rather than any other multiple wh-construction (Sec. 2 below). Still, standard semantic analyses of FRs with just a single wh-word (***single wh- FRs***) cannot straightforwardly extend to multiple wh- FRs (Sec. 3 below). We propose a solution to this puzzle by providing the first compositional analysis of multiple wh- FRs, which builds on previous work on single wh- FRs and functional readings in interrogatives and relative clauses. We focus on Romanian (using data from a variety of Romanian spoken in Transylvania) that makes use of multiple wh- FRs productively and also displays all the other multiple wh-constructions listed above (e.g., Comorovski 1996, Grosu 2004, Braşoveanu 2012).

2. The syntactic status of multiple wh- FRs. As far as their structure is concerned, multiple wh- FRs are clearly FRs rather than some other multiple wh-fronting clause. In particular, multiple wh- FRs are not interrogative clauses. First, like single wh- FRs, multiple wh- FRs can occur as arguments of non-interrogative predicates like 'wrap' and 'give', as in (1) and (2), or 'prepare' in (3). Second, they exhibit the same restrictions on wh-words as single wh- FRs. Romanian single wh- FRs allow for almost all wh-words that can occur in interrogatives (e.g., Grosu 2013, Caponigro & Fălăuş 2017), the complex wh-phrase *care+NP* 'which NP' being the only exception (4). *Care+NP* cannot occur in multiple wh- FRs either (5):

(3) Am   pregătit [ce   când vei   mânca].   [multiple wh- FR]
       have.1 prepared   what when will.2SG eat
       Roughly: 'I prepared the thing/things you will eat at the moment(s) appropriate for it/them.'

(4) *Am   vorbit [cu   care băiat ai   vorbit şi tu].   [single wh- FR]
       have.1SG spoken   with which boy   have.2SG spoken also you

(5) *Voi   da [care   cadou cui   merită].   [multiple wh- FR]
       will.1SG give which gift   who.DAT deserves

Multiple wh- FRs also differ from MECs. Grosu (2004, 2013) and Šimík (2011) clearly show that multiple wh- MECs are introduced by a limited class of existential predicates across languages, i.e., existential 'be' and 'have', which does not include predicates like 'give', 'prepare' or 'wrap'

in (1)-(3) above. Moreover, MECs have to use the subjunctive or the infinitive, while single and multiple wh- FRs allow for the use of the indicative (as illustrated in (1) and (3)).

3. A semantic analysis for multiple wh- FRs. The main semantic properties of a multiple wh- FR are: (i) it is interpreted as a definite description, like a single wh- FR, and (ii) the meaning of its first/leftmost wh-word affects the meaning of the other wh-words. The main idea behind standard analyses of single wh- FRs – details aside – is that the wh-word licenses a trace/variable over individuals, λ-abstraction applies to it producing a set of individuals, and finally a maximality operator or a type-shifting operation applies returning the unique maximal member of that set, the same denotation as a definite description (Jacobson 1995; Dayal 1996; Caponigro 2003, 2004). This approach cannot straightforwardly apply to multiple wh- FRs. The two or more wh-words in a multiple FR would license more than one variable over individuals and, therefore, would trigger multiple λ-abstractions, which in turn would produce a semantic object as the meaning of a multiple wh- FR that would be more complex than a set of individuals, preventing the meaning shift to a maximal individual. To overcome this problem and account for the features in (i)-(ii), we propose that the first wh- word (i.e., the wh-word that c-commands all the others in a multiple wh- FR) licenses a variable over individuals (like in a single wh- FR), while each of the other wh-words licenses a complex functional variable. Let us discuss the details of our proposal by looking at (a slightly simplified version of) the multiple wh- FR in (1). Its Logical Form is in (6a) and its logical translation in (6b). The higher wh-word ce_1 'what' licenses a trace (t_1)/variable (x_1) ranging over individuals, while the lower wh-word cui_2 'who.DAT' licenses a trace (**t_2^1**)/variable (**$f_2(x_1)$**) ranging over functions f_2 from individuals to individuals (Skolem functions, $<e,e>$) and taking the individual denoted by the variable x_1 as their argument (6b). In this way, the interpretation of the lower trace ends up depending on both wh-words, as highlighted by the double indexing.

(6) a. [$\boxed{ce_1}$　$\boxed{cui_2}$　*dăm*　t_1　**t_2^1**]
　　　　　what　who.DAT　give.1PL

　　b.　$\sigma x_{1<e>}[\lambda x_1[\text{inanimate}(x_1) \wedge \forall x(\text{human}(f_2(x))) \wedge \text{give}(\text{sps},x_1,f_2(x_1))]]]$　　sps = speakers
　　　　IN PROSE: the unique maximal (singular or plural) individual of the set of individuals that are inanimate and should be given by the speakers to the individuals that are associated with them according to the contextually salient mapping $g(f_2)$, which maps every individual to a human individual [σ is the maximality operator applying to a set of individuals, as in Link 1983].

We are assuming that any wh-word in a FR in Romanian can license two different traces/variables. For instance, we have seen that in an example like (6) above, the wh-word *cui* 'who.DAT' licenses a functional trace and is interpreted as in (8a) (a function taking a set of Skolem functions as its argument and returning the truth if the contextually salient Skolem function $g(f_2)$ is in that set and returns human individuals for each of its arguments). On the other hand, in a single wh- FR with just the wh-word *cui* (7), *cui* licenses a simple trace over individuals and behaves like a plain set restrictor (8b).

(7) Am　　dat　　cadouri [$\boxed{cui}$　　ai　　dat　şi　tu].
　　have.1sg give　gifts　　who.DAT have.2sg given also you
　　'I gave gifts to those you did.'

(8) a. *cui* FUNCTIONAL ~>$\lambda F_{<<e,e>,t>} [\forall x(\text{human}(f_2(x))) \wedge F(f_2)]$
　　b. *cui* INDIVIDUAL ~> $\lambda Q_{<e,t>} \lambda x_{1<e>} [\text{human}(x_1) \wedge Q(x_1)]$

More generally, the highest wh- word in a FR can be interpreted as a simple set restrictor. Lower wh-words, if any, have to be interpreted "functionally" with their semantic contribution being dependent on a higher wh-word. Crucially, this constraint on the interpretation of wh-words in

multiple wh- FRs does not need to be stipulated: any other combination of meanings of wh-words would produce a semantic object that cannot combine with the remainder of the matrix clause. Our proposal relies on the hypothesis that wh-words can license two kinds of traces/variables. The "individual" vs. "functional" nature of wh-words and their traces has been independently proposed to derive functional readings of (i) wh-interrogatives (Engdahl 1980, 1986; Chierchia 1991, 1993; Dayal 1996; a.o.), (ii) multiple wh- correlatives (Dayal 1996), (iii) headed relative clauses (Sharvit 1999a), and (iv) single wh- FRs with a quantifier, e.g., [*What every student got*] *was a nuisance to him* (Sharvit 1999b, ex. 92). On our account, multiple wh- FRs represent a further instantiation of the dual semantic nature of wh-words.

4. Further issues. In addition to comparing multiple wh- FRs to other multiple wh-fronting constructions, we conclude by discussing possible reasons behind the cross-linguistic rarity of multiple FRs, together with the observation that multiple wh- FRs are also attested in varieties of Standard American English in which (9) and (10) fully acceptable.

(9) I gave you [what to put where].

(10) I'll prepare [what to give to who(m)].

REFERENCES
Brașoveanu 2012. 'Correlatives', *Language and Linguistics Compass* 6: 1–20. **Caponigro** 2003. *Free not to ask: On the semantics of Free Relatives and wh-words cross-linguistically*, PhD dissertation, UCLA. **Caponigro** 2004. 'The semantic contribution of wh-words and type shifts: Evidence from Free Relatives cross-linguistically', in *Proceedings from SALT XIV*, 38–55, CLC Publications. **Caponigro** & **Fălăuş** 2017. 'Free choice free relatives in Italian and Romanian', *Natural Language and Linguistic Theory*. **Chierchia** 1991. 'Functional WH and weak crossover', in *Proceedings of WCCFL 10*, CSLI. **Chierchia** 1993. 'Questions with quantifiers', *Natural Language Semantics* 1: 181–234. **Citko** 2009. 'What don't wh-questions, free relatives, and correlatives have in common?', in *Correlatives cross-linguistically*, 49–80, John Benjamins. **Comorovski** 1996. *Interrogative Phrases and the Syntax–Semantics Interface,* Kluwer. **Dayal** 1996. *Locality in WH Quantification: Questions and Relative Clauses in Hindi,* Kluwer. **Dayal** 2016. *Questions,* Oxford University Press. **Engdahl** 1980. *The syntax and semantics of questions in Swedish,* PhD dissertation, UMass Amherst. **Engdahl** 1986. *Constituent Questions: The Syntax and Semantics of Questions with Special Reference to Swedish,* Reidel. **Grosu** 2004. 'The syntax-semantics of modal existential wh constructions', in *Balkan syntax and semantics*, 405–438, John Benjamins. **Grosu** 2013. 'Relative Clause Constructions and unbounded dependencies', in *A Reference Grammar of Romanian,* 597–662, John Benjamins. **Jacobson** 1995. 'On the quantificational force of English free relatives', in *Quantification in natural languages*, 451–486, Kluwer. **Link** 1983. 'The Logical Analysis of Plurals and Mass Terms: A Lattice-Theoretical Approach', in *Meaning, Use and Interpretation of Language*, 303–323, de Gruyter. **Lipták** 2009. *Correlatives Cross-linguistically*, John Benjamins. **Rudin** 2007. 'Multiple *wh*-relatives in Slavic', in *Formal approaches to Slavic linguistics*, 282–307, Michigan Slavic. **Rudin** 2008. Pair-list vs. single pair readings in multiple wh free relatives and correlatives. *Kansas Working Papers in Linguistics* 30: 257–267. **Šimík** 2011. *Modal existential wh-constructions*, PhD dissertation, University of Groningen. **Sharvit** 1999a. 'Functional Relative Clauses', *Linguistics and Philosophy* 22: 447–478. **Sharvit** 1999b. 'Connectivity in Specificational Sentences', *Natural Language Semantics* 7: 299–339.