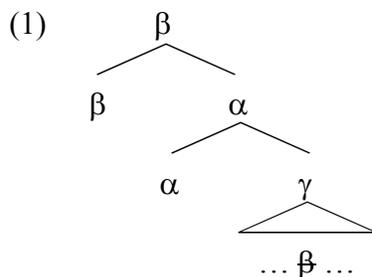


FREE RELATIVES, CORRELATIVES, PROBING ALGORITHM AND RELABELING*

Egor Tsedryk and Elena Dimova
Saint Mary's University and Université de Montréal

This paper discusses a derivational possibility illustrated in (1): an internally merged syntactic object ‘projects’, or provides a ‘label’ for the structure it is merged with (Starke 2001; Iatridou, Anagnostopoulou and Izvorski 2001; Bury 2003; Donati 2006; Citko 2008; Donati and Cecchetto 2011; Cecchetto and Donati 2015).



We use ‘project’ and ‘label’ interchangeably. Both refer to a syntactic object resulting from Merge in narrow syntax. We assume that a label is a set of features, and labeling a branching node is part of a narrow-syntactic computation:

- (2) Merge (α , β) results in a syntactic object whose label is a set of features of either α , β or both (partially based on Citko 2008).

We start our discussion of (1) with a quick overview of a relabeling analysis of free relatives, as proposed in Donati 2006, Donati and Cecchetto 2011 and Cecchetto and Donati 2015. According to this analysis, outlined in section 1, free relatives do not involve a probe-goal relationship between C and a *wh*-word. We argue against this view, providing evidence from free relatives and correlatives in Russian (3) and Bulgarian (4) (the bracketed CPs in (a) are free relatives and those in (b) are correlatives).¹ We claim that C is a probing head in both free relatives and correlatives, which are discussed in sections 2 and 3 respectively.

- (3) a. Ja prinēs [čto ty prosil].
 I.NOM brought what.ACC you.NOM asked
 ‘I brought what you asked for.’

* We thank the audience of the CLA 2016 syntax session on relatives and, especially, Brandon Fry, Diane Massam, Keir Moulton and Tom Leu for their helpful questions and comments.

¹ We use the terms ‘free relative’ and ‘correlative’ to refer to subordinate clauses.

- b. [Čto ty prosil], to ja i prinēs.
 what.ACC you.NOM asked that.ACC I.NOM FOC brought
 [Lit.: ‘What you asked for, that thing I brought.’]
- (4) a. Donesoh [kakvoto poiska].
 I. brought what.ACC you.asked
 ‘I brought what you asked for.’
- b. [Kakvoto poiska], tova i donesoh.
 what.ACC you.asked that.ACC FOC I.brought
 [Lit.: ‘What you asked for, that thing I brought.’]

In section 4, we propose to derive (1) from (i) a probe-goal relationship between C and a *wh*-word and (ii) a labeling algorithm resulting from this relationship and pied-piping. We show that interrogative *wh*-clauses naturally fall under the same analysis. In fact, our analysis implies that the label of a *wh*-clause crucially depends on the featural composition of its *wh*-word (this composition can in most cases be predicted from the morphological makeup of the *wh*-word; e.g., *what* vs. *whatever*).

1. Probing vs. non-probing C

Cecchetto and Donati (henceforth C&D) (2015) implement (1) based on definitions in (5) and (6) (C&D 2015: 45).

(5) *Label*

When two syntactic objects α and β are merged, a subset of the features of either α or β become the label of the syntactic object $\{\alpha, \beta\}$. A label

- a. can trigger further computation, and
- b. is visible from outside the syntactic object $\{\alpha, \beta\}$.

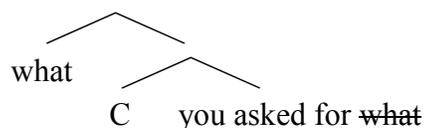
(6) *Probing Algorithm*

The label of the syntactic object $\{\alpha, \beta\}$ is the feature(s) that act(s) as a probe for the merging operation creating $\{\alpha, \beta\}$.

C&D take a lexicalist stance, defending ‘word’ as a linguistic unit and providing arguments against a syntactiocentric view of morphology. Whether mono- or multimorphemic, words, according to C&D, are syntactic atoms that have a psycholinguistic reality. The narrow syntax manipulates preassembled bundles of features that come with words from the lexicon. In relation to Merge, C&D assume that a word can be a probe by virtue of being a syntactically primitive unit. That is, when one of the syntactic objects is a word, and the other is a phrase, it is the word that projects. When a *wh*-word is merged with a CP, there are two options: C is a probing category, in which case C projects (given (6)), or C is not a probing category, in which case the *wh*-word projects.

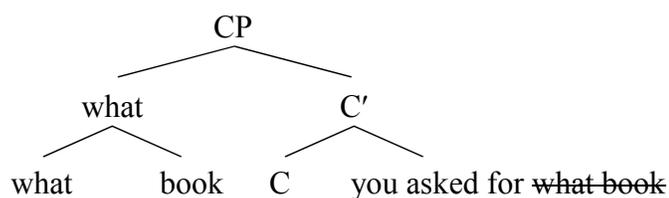
For example, a structure like (7) can have a label of C or that of *what*. This ambiguity arises from the fact that *what* is a word: if C is a probing category, C projects; if not, *what* projects, turning the clause into a DP. This is what C&D call ‘relabeling’.

(7) [what you asked for]



Relabeling is excluded in (8), where the internally merged syntactic object is a phrase (*what book*), not a word. A probing C is the only option available in this case, and the resulting syntactic object is unambiguously a CP.

(8) [what book you asked for]



The distributional difference between (7) and (8) is shown in (9). Only (7) can be a free relative, while (8) can only be an embedded *wh*-question.

- (9) a. I wonder [what you asked for]. (C is a probe)
 b. I brought [what you asked for]. (relabeling by *what*)
 c. I wonder [what book you asked for]. (C is a probe)
 d. *I brought [what book you asked for]. (impossibility of relabeling by *what book*)

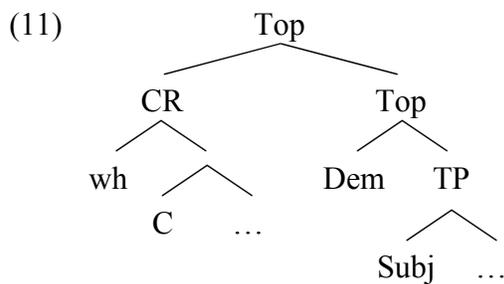
In sum, C&D analyse free relatives as relabeled structures, in which C is not a probing category and an internally merged *wh*-word projects, turning a CP into a DP. We leave the discussion of such cases as *I'll bring whatever book you ask for* until sections 3 and 4. The next section presents the case of correlatives in Russian and Bulgarian. As we will show, correlatives are expected to have a probing C, if we rely on the assumptions presented in this section.

2. Correlatives in Russian and Bulgarian

Crosslinguistically, correlatives have four basic properties (Lipták 2012: 248): (i) peripheral position in the main clause; (ii) association with a demonstrative; (iii) free relative nature; (iv) ability to host multiple relative pronouns. The fourth property is illustrated in (10) (with Russian in (a) and Bulgarian in (b); English translation is the same for both languages).

- (10) a. [Kto čto prosil], tomu to i
 who.NOM what.ACC asked that.person.DAT that.thing.ACC FOC
 prinesli.
 they.brought
- b. [Koj(to) kakvoto poiska], na nego tova i
 who.NOM what.ACC asked to that.person.DAT that.thing.ACC FOC
 donesoha.
 they.brought
 ‘They brought everyone what she/he asked for.’
 [Lit.: ‘Whoever asked whatever, that thing to that person they brought.’]

Following Lipták 2012, we assume a base-generation analysis of correlatives: the subordinate clause (CR, standing for ‘correlative’) is base-generated in a topic position above the topicalized demonstrative, as shown in (11). (See Bhatt 2003 for a movement analysis; nevertheless, Bhatt assumes base-generation for correlatives with multiple pronouns.)



At this point, we have the following question: What is the label of CR in (11)? If we follow C&D, CR should be a CP, since the *wh*-element can be phrasal, as shown in (12).

- (12) a. [[Kakuju knigu] ty prosil], takuju ja i prinēs.
 [what book].ACC you.NOM asked such.ACC I.NOM FOC brought
- b. [[Kakvato kniga] poiska], takava i donesoh.
 [what book].ACC you.asked such.ACC FOC I.brought
 [Lit.: ‘What book you asked for, such (book) I brought.’]

There is also a question about a formal relationship between CR and Dem. From a semantic point of view, Srivastav (1991) and Dayal (1996) analyze CR as a generalized quantifier, binding a variable (Dem). That is, it is the whole clause (not just the *wh*-word) that binds Dem. At the same time, in Russian and Bulgarian the *wh*-word and Dem have to match in formal features (except case). Paradigmatically, each ontological category has

a corresponding *wh*-Dem pair, as shown in (13), where we present a partial paradigm of *wh*-Dem pairs.

(13) *Examples of wh-Dem pairs in Russian and Bulgarian*

PERSON	kto ... tot kojto ... toj	‘who ... that (person)’
THING	čto ... to kakvoto ... tova	‘what ... that (thing)’
PLACE	gde ... tam kâdeto ... tam	‘where ... there’
TIME	kogda ... togda kogato ... togava	‘when ... then’

If the CR node in (11) had the label of the *wh*-word (contra C&D), the whole clause would still count as a binder of Dem, but this clause would have a label of the word whose features should match the bindee. In other words, the *wh*-word would not be directly related to Dem, but via its label in the CR node.

All in all, if we rely on C&D’s assumptions outlined in section 1, the *wh*-phrase in (12) implies that free relatives and correlatives should have different labels: a free relative is a DP (C is not a probing category), while a correlative is a CP (C is a probing category). If the correlative does not have a D-like property, how can it be associated with a D-like element, such as a demonstrative? Finally, it is not clear how the relabeling analysis would handle the cases with multiple pronouns, as in (10). The next section discusses *wh*-phrases in the case of free relatives.

3. Free relatives with *wh*-phrases

In (14a), we show that the *wh*-element cannot be phrasal in Russian free relatives. This is expected under the relabeling analysis of C&D. In Bulgarian, on the other hand, the *wh*-element can be phrasal in free relatives, just like it was possible in correlatives; compare the free relative in (14b) with the correlative in (12b).

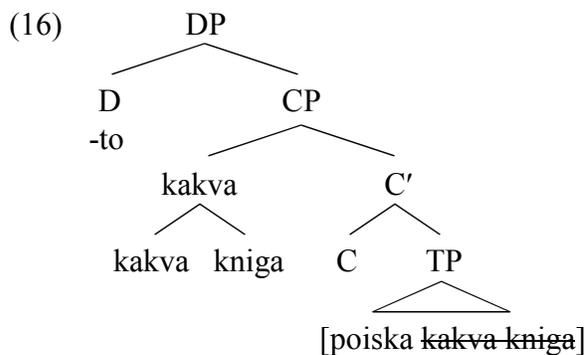
- (14) a. *Ja prinēs [[kakuju knigu] ty prosil].
I.NOM brought [what book].ACC you.NOM asked
‘*I brought what book you asked for.’
- b. Donesoh [[kakvato kniga] poiska].
I.brought [what book] you.asked
‘I brought the kind of book you asked for.’

Note, however, that in Russian the same *wh*-word (*kakuju*) is used in *wh*-questions, (15a), but it must be without the morpheme *-to* in Bulgarian, (15b).

- (15) a. [Kakuju knigu] ty prosil?
[what book].ACC you.NOM asked
- b. [Kakva kniga] poiska?
[what book] you.asked
'What book did you asked for?'

In other words, the invariant morpheme *-to* makes the difference in (14): Russian uses bare *wh*-expressions in its correlatives, free relatives and interrogatives, whereas Bulgarian uses *-to* as a relativizer (compare *kakva* in (15b) with *kakvato* in (14b)). In the case of multiple non-interrogative *wh*-fronting, this morpheme is obligatory on the second *wh*-word and optional on the first one (see (10b)). Historically, *-to* originates from a demonstrative, just like the definite article in Bulgarian does. It has been analyzed as a definiteness marker/article (Rudin 1986, Izvorski 2000), a modal element (Iliev 2011), a relative complementizer (Rudin 2009), and a nominalizer (Franks and Rudin 2015) (see also Rudin 2014 for further discussion).

Within C&D's framework, *-to* could be analyzed as an externally merged D that selects CP (see (16) on the next page). The latter would have a probing C that triggers internal Merge of *kakva kniga* to Spec,CP. Since we have a *wh*-phrase, it does not relabel the structure; DP is obtained when *-to* enters the derivation. *Kakva-to* would be derived by a morphological merger between *-to* and *kakva* (either *kakva* is incorporated into D, or *-to* is affix-lowered to *kakva*).



A similar analysis was proposed for *-ever* (as in *what-ever*) by Kayne (1994), who considers *-ever* as a reduced form of *every* (see Citko 2004: 117). That is, the phrase *whatever book*, as in *I'll buy [[whatever book] you ask for]*, is analogous to *kakvato kniga* in (14b). Moreover, this analysis could be applied to Bulgarian correlatives in (12b) and, by analogy, we could also postulate a non-lexicalized D in Russian correlatives, (12a). Nevertheless, if this analysis had to be extended to correlatives, it faces the challenge of multiple *wh*-fronting: How could we have a structure like (16) with multiple pronouns, as in (10)? Would we have more than one head D? Why is *-to* mandatory on the second *wh*-word, but optional on the first one (see (10a))? Finally, if *-to* represents a

separate syntactic head that is affixed to an adjacent *wh*-expression, we would expect it on the first *wh*-word, not on the second one, contrary to fact.

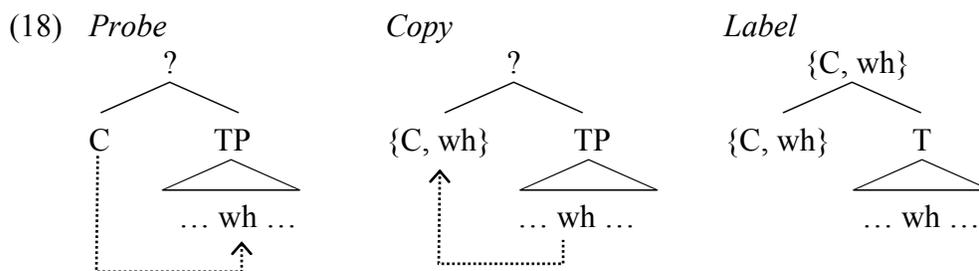
We hypothesize that *wh*-expressions with *-to*, like *kakvato*, are selected from the lexicon as complete lexical items (i.e., they are not derived by Merge: *kakva* + *to*). It is possible that at some point *-to* was a separate lexical item, but this is not the case in the present-day Bulgarian. The next section presents our proposal.

4. Probe-goal, pied-piping and labeling

We claim that in free relatives, just like in *wh*-questions and correlatives, C enters into a probe-goal relationship with a *wh*-word. This relationship implies that the *wh*-word's features are copied to C. We propose a general labeling algorithm independently of any specific construction, and based on two assumptions in (17).

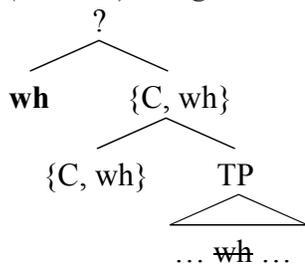
- (17) a. The category containing the probe projects (cf. 6).
 b. If α and β are merged, and they share a set of features, this set of features labels the product of Merge(α , β) (cf. 'feature sharing' in Chomsky 2013).

The derivation proceeds in two derivational steps and five algorithmic subparts. The first derivational step is the merger of a probing C with TP. We have to determine the label of the syntactic object created by Merge(C, TP). This label is calculated in three algorithmic stages, which we identify in (18) as *Probe*, *Copy* and *Label*. These stages are not independent syntactic operations, they are part and parcel of the probe-goal relationship between C and a *wh*-word. As a result of probing by C, the *wh*-word's features are copied to C, and we obtain the set {C, wh}, which labels the product of Merge(C, TP) (based on (17a)). Note that it is not just C that projects in (18), but C plus the features it probes: being a probing category, C is inseparable from the features of its goal. In some sense, the label in (18) "records" the derivational history of the probe-goal relationship between C and the *wh*-word.

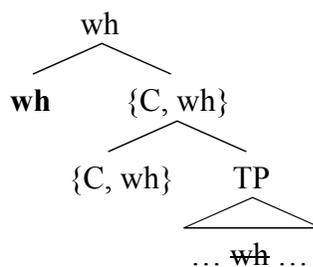


The second derivational step is internal Merge of the *wh*-word/phrase (we use the boldface to indicate the pied-piped material that has an actual phonetic form at the sensorimotor interface). Now, we have to determine the product of Merge (**wh**, {C, wh}). Based on (17b), the label should be 'wh', which is the set of features shared between **wh** and {C, wh}. This how we end up with a syntactic object that has the same label as the *wh*-word.

(19) (Internal) Merge



Label



The whole idea behind (18)-(19) is that the label has to be calculated at each derivational step. We do not just take for granted that C projects whenever *wh*-movement occurs. But what is exactly hidden behind the traditional CP label? Is it the same label, when there is no *wh*-movement? The current research on labels (see, e.g., Bošković 2016) is an opportunity to raise this kind of question. We broke the *wh*-movement (probe by C + internal Merge) into five algorithmic steps calculating the label of the syntactic object resulting from pied-piping. According to our algorithm, this syntactic object (the *wh*-clause) has the label of the *wh*-word that is initially probed by C. This is our implementation of (1). We will now discuss the consequences of our proposal.

Let us start with two pairs of sentences in (20) and (21), featuring a *wh*-question in (a) and a free relative in (b). What the verb selects in (20) is the label of the *wh*-word, which is also the label of the entire *wh*-clause (presented as a subscript of *what*).² We return to the interrogative vs. non-interrogative distinction after the diagram in (23).

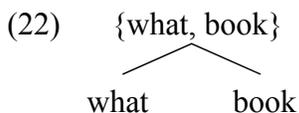
- (20) a. I wonder [_{what} what you asked for].
 b. I brought [_{what} what you asked for].

In (21), we have a fronted *wh*-phrase, but – crucially – the label of the clause is still *what*, not the entire phrase (*what book*). Therefore, what is interpreted at the interface in (21b) is the string *brought what*, not *brought what book* (the matrix verb does not see any further than the label it is merged with). In other words, the phrase *what book* does not have any thematic relationship with the matrix verb, and it cannot be properly interpreted in the matrix clause, hence the ungrammaticality in (21b).

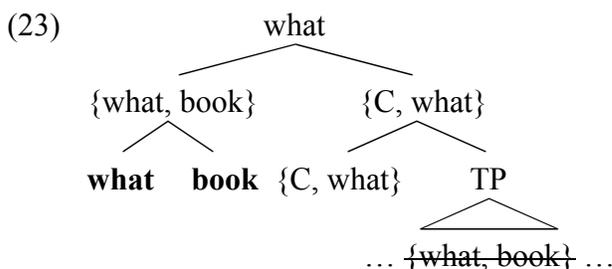
- (21) a. I wonder [_{what} [what book] you asked].
 b. *I brought [_{what} [what book] you asked].

For the sake of concreteness, we follow Citko (2008: 915) and analyze D + N as an instance of *Project Both*. That is, the label of *what book* has both *what* and *book*, as shown in (22).

² It is important to keep in mind that the label is the bundle of features defining *what* as a lexical item (e.g., it is not a non-interpretable *wh*-feature usually postulated at the left periphery).

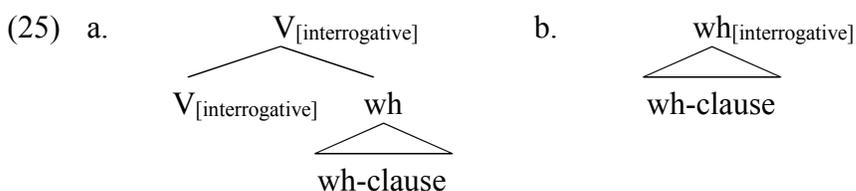


According to the algorithm in (18)-(19), the labeled structure looks as shown in (23). C probes *what* (the latter's features are copied to C), the whole phrase *what book* is pied-piped to the C domain (*Merge* in (19)), but the uppermost label is only *what* (the shared set of features between the *wh*-phrase and C). Again, the bolded part is what is actually pronounced.



As far as we know, the common assumption is that interrogative *wh*-clauses, as in (20a) and (21a), have a semantic Q-feature (interrogative force). Free relatives, on the other hand, would lack this feature in C (see, e.g., Ott 2011 for an account of free relatives based on this opposition). We would like to suggest that interrogative force is external to the label of a *wh*-clause. It can be a semantic feature belonging to the matrix V (*wonder* in (20a) and (21a); see (25a)), but it can also be an interpretation attributed to the label of a root clause at the interface, as in (24) (see (25b)).

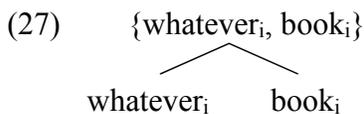
(24) What (book) did you ask for?



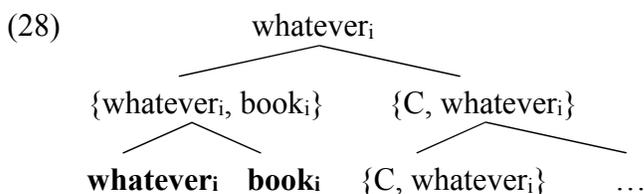
We suggest that interrogative interpretation of a *wh*-label is possible only with bare *wh*-expressions (e.g., *what*), which have a “weak existential commitment” (Arsenijević 2009: 137). A morphologically more complex *whatever* has a stronger existential commitment than *what*. Thus, as expected, interrogatives like (26) are impossible: the label is too specific to receive an interrogative reading at the interface.

- (26) a. *Whatever (book) did you ask for?
 b. *I wonder whatever (book) you asked for.

What happens in such *wh*-expressions as *whatever* is that the morpheme *-ever* links them to a presupposed set of entities. We represent *whatever book* in (27) with an index that is shared with the nominal head (this index is considered to be a feature of *-ever*). We assume that *whatever* is a lexical item taken from the lexicon as a unit (it is not derived by Merge: *what* + *ever* in syntax).



Thus, when C probes *whatever*, the latter's features (including the index) are copied to C, resulting in (28).



The matrix V in (29) selects the label linked to the noun via its morpheme *-ever*. Therefore, what is interpreted at the interface is *bring whatever book* and not just *bring whatever* (the whole *wh*-phrase has a thematic relation with the matrix V and this is the difference in comparison with *brought what book* in (21b)).

(29) I'll bring [*whatever* [whatever book] you ask for].

Now we can go back to the difference between Russian and Bulgarian, noted in (14) and repeated in (30). Recall that Russian cannot have a phrasal *wh*-fronting in its free relatives, while this option is available in Bulgarian. In the light of our proposal, this difference boils down to a lexical idiosyncrasy: Russian does not have a morpheme like *-ever* in English or *-to* in Bulgarian, which can be attached to a bare *wh*-expression to form a relative pronoun.³

- (30) a. *Ja prinēs [[kakuju knigu] ty prosil].
 I.NOM brought [what book].ACC you.NOM asked
 ‘*I brought what book you asked for.’
- b. Donesoh [[kakvato kniga] poiska].
 I.brought [what book] you.asked
 ‘I brought the kind of book you asked for.’

³ Russian does have *kakaja-to* (or *kakuju-to* accusative), but it is not a relative determiner; it is an indefinite one, meaning ‘some’.

As a consequence of its “lexical deficiency”, Russian has only bare *wh*-expressions at its disposition (see (31)), while Bulgarian has a choice between bare ones, as in (32a), and those with *-to*, as in (32b) (by analogy with (27)).

(31) {kakuju, knigu}
 kakuju knigu

(32) a. {kakva, kniga} b. {kakvato_i, kniga_i}
 kakva kniga kakvato_i kniga_i

That is, Russian uses bare *wh*-expressions in interrogatives, free relatives and correlatives, while Bulgarian uses bare *wh*-expressions exclusively for interrogatives. Compare again (30) with (33) (repeating (15)).

(33) a. [Kakuju knigu] ty prosil?
 [what book].ACC you.NOM asked
 b. [Kakva kniga] poiska?
 [what book] you.asked
 ‘What book did you asked for?’

5. Conclusion

To conclude, we proposed to derive (1) from a probe-goal relationship (C-*wh*) and the labeling algorithm in (18)-(19). Unlike C&D, we do not stipulate that (1) is necessarily linked to the syntactic primitiveness of the moved *wh*-element (word vs. phrase). In our approach, the pied-piped element can be a *wh*-word or a *wh*-phrase. However, the crucial part of our proposal is that the whole *wh*-clause bears the label of the *wh*-word probed by C, not the label of the *wh*-phrase. We also suggested that the interrogative force is an interface property of a *wh*-label belonging to a bare *wh*-expression. Relativization, in its turn, may involve a bare *wh*-expression, but it can also involve a *wh*-expression with a bound morpheme like *-ever* in English or *-to* in Bulgarian. More generally, our analysis implies the following (with A and D being potentially falsifiable predictions):

- A. All languages are expected to use only bare *wh*-expressions for interrogatives.
- B. Some languages use bare *wh*-expressions for relatives (e.g., Russian).
- C. Some languages use bare *wh*-expressions only for interrogatives (e.g., Bulgarian).
- D. No language is expected to use bare *wh*-expressions for relatives without using them for interrogatives.

We hope that these generalizations are a step towards a more complete crosslinguistic picture that links together the morphological makeup of the *wh*-expressions and their usability across constructions.

Appendix

In section 4, we did not discuss multiple *wh*-pronouns. In this appendix, we briefly comment on the following question: What is the label of a *wh*-clause with multiple *wh*-fronting, as in (34) (from Russian)?

- (34) Kto čto prosil?
 who.NOM what.ACC asked
 ‘Who asked (for) what?’

We assume that this is the case of multiple C probing. That is, feature sets are copied in a sequence, starting from the highest *wh*-word (*kto*) and ending by the lowest one (*čto*). The result is a label with a sequence of feature sets in C. Whatever the linear order of pied-piped *wh*-expressions (*kto čto* or *čto kto*), the sequenced label remains the same (the features of the highest *wh*-word are always ordered first in the label). When *čto* or *kto* is internally merged, the projected category is not only *čto* or *kto*, but both are projected as a unit (an ordered pair).

- (35)
-
- ```

 <kto, čto>
 / \
 kto <kto, čto>
 / \
 čto {C, <kto, čto>}
 / \
 {C, <kto, čto>} TP
 / \
 [kto čto prosil]

```

Furthermore, a syntactic object like (35) can be selected by a non-interrogative V, as in (36). It is important to emphasize that V does not select either *kto* or *čto*, but it selects an ordered pair.

- (36) Ja    prinēs [kto        čto        prosil].  
 I.NOM brought who.NOM what.ACC asked  
 ‘I brought what you (all of you/each of you/everyone) asked for.’

In these contexts, Bulgarian uses *wh*-expressions with the morpheme *-to*, which – we remind – is optional on the first *wh*-pronoun and obligatory on the second (see section 2):

- (37) Donesoh [koj(to)    kakvoto    poiska].  
 I brought who.NOM what.ACC asked  
 ‘I brought what you (all of you/each of you/everyone) asked for.’

We suppose that the pattern with a single *-to* emerges when two *wh*-pronouns are reanalyzed as a single unit at the sensorimotor interface. That is, the string of two *wh*-pronouns in (37) is reanalyzed as an ordered pair with a single suffix *-to*: [koj kakvo]-*to* (leading to a deletion/non-pronunciation of *-to* on the first *wh*-pronoun). Nevertheless, see Dimova and Tellier (to appear) for an alternative analysis.

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