Multiple (Coordinated) (Free) Relatives

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Abstract: Building on the existing crosslinguistic research on wh-questions with coordinated wh-pronouns, in this paper we turn to relative clauses and examine the effects of coordination on the grammaticality of relative clauses with multiple relative pronouns. We first discuss a general restriction on relativization, which bans multiple relativization from a single clause. We attribute this restriction to either a syntactic violation (impossible promotion of the head) or a semantic violation (semantic mismatch between the head and the relative clause). Next, we turn to free and headed relatives with coordinated wh-pronouns, showing that they do not show the same amount of crosslinguistic variation as wh-questions with coordinated wh-pronouns. In particular, irrespective of the availability of a mono-clausal structure for wh-questions with coordinated wh-pronouns in a language (which in turn correlates with the availability of multiple wh-fronting), a mono-clausal structure for free relatives with coordinated wh-pronouns is *not* available. In this respect, free relatives pattern with headed relatives rather than wh-questions. We derive this parallelism from a fundamental difference between relative clauses and questions: the presence of a CP external head in relative clauses, but not in wh-questions.

Keywords: coordinated wh-questions, multiple (coordinated) relative pronouns, free relatives, headed relatives

1. Introduction

Coordinated Wh-Questions (henceforth **CWHs**), i.e. questions in which two (or more) wh-phrases are coordinated in a clause-initial position, have received a fair amount of attention in the literature (see Chavez and Paperno 2007, Citko and Gračanin-Yuksek 2013, Gračanin-Yuksek 2007, Lipták 2011, Scott 2012, Whitman 2004, among many others). Crosslinguistic investigations of such questions have shown that they are possible not only in languages like Russian (i.e. multiple wh-fronting (**MWH**) languages, which front all wh-phrases overtly), as shown in (1a), but also in languages like English (non-**MWH** languages, which front only one wh-phrase), as shown in (1b).

(1) a. **Čto i kogda** Ivan pročital? *Russian*
what and when Ivan read
'What and when did Ivan read?'
b. **What and when** did John sing?

The grammaticality of CWHs in languages like English shows that the derivation of at least some CWHs (namely those in non-MWH languages) is not contingent on multiple wh-fronting and, consequently, that the structure of at least some CWHs is quite different from the structure of regular multiple wh-questions. This has led researchers to propose that CWHs are in principle ambiguous, and can involve either a mono-clausal or a bi-clausal structure:

(2) a. [CP [&P **WH1** & **WH2**] [TP … ***t1*… *t2*…]] MONO-CLAUSAL CWH
b. [&P [CP **WH1** [TP …***t1***…]] **&** [CP **WH2** [TP…***t2***…]]] BI-CLAUSAL CWH

In this paper, building on our previous work on CWHs, we examine wh-coordination in relative clauses. We look at two types of relative clauses: free relatives (**FRs**) and headed relatives.

Given the many well-documented parallels between wh-questions and relative clauses (indicated, for example, by the parallelism between the bolded CPs in (3a-c) below), we might expect coordination of wh-phrases in relative clauses to be not only possible, but, in a given language, to be subject to the same restrictions as coordination of wh-phrases in wh-questions.[1]

(3) a. Mary wondered **who(m) John recommended**. WH-QUESTION
b. Mary hired **who(m) John recommended**. FREE RELATIVE
c. Mary hired the person **who(m) John recommended**. HEADED RELATIVE

Surprisingly, this is *not* the case. Focusing on two MWH languages (Croatian and Polish), and contrasting them with English (a representative of a non-MWH language), we first examine wh-questions in these languages with respect to the compatibility with multiple wh-pronouns. We then proceed to investigate free and headed relative clauses with multiple non-coordinated wh-pronouns in both types of languages. Finally, we turn to the effects of coordination on the grammaticality of relative clauses with multiple wh-pronouns. In Section 2, we present the (somewhat simplified) analysis of cross-linguistic variation in CWHs due to Citko and Gračanin-Yuksek (2013). In Section 3, we turn our attention to relative clauses with multiple non-coordinated wh-pronouns. We show that such multiple relatives are ungrammatical in all three languages under consideration, as illustrated in (4a-b) for English free relatives. We derive their ungrammaticality from the presence of the head in both headed and free relative clauses, which leads to both a syntactic and a semantic violation in the presence of multiple relative pronouns.

(4) a. *John eats **whatever whenever** Peter cooks.
b. *John devours **whatever whenever** Peter cooks.

In Section 4, we turn our attention to multiple relatives in which the relative pronouns are coordinated and show that they become grammatical only under certain circumstances. For example, coordination improves the status of (4a) but not (4b), as shown by the following contrast:

(5) a. John eats **whatever <u>and</u> whenever** Peter cooks.
b. *John devours **whatever and whenever** Peter cooks.

We further show that the crosslinguistic variation that we find in the realm of coordinated relative clauses does not mirror the variation that we find in the realm of coordinated wh-questions. In particular, we show that relative clauses in MWH languages are subject to the same restrictions as relative clauses in non-MWH languages. We attribute these restrictions to a fundamental difference between relative clauses and wh-questions: the presence of an external head in the former but not the latter.

[1] We are not claiming here that there are no differences between wh-questions and free relatives. See Bresnan and Grimshaw (1978), for example, for a careful description of differences such as the behavior of the two with respect to matching effects and agreement.

2. Coordinated Wh-Questions (CWHs) Crosslinguistically

Many researchers agree that CWHs are structurally ambiguous and may be derived either from a mono-clausal or a bi-clausal structure (Citko and Gračanin-Yuksek 2013, Gračanin-Yuksek 2007, Lipták 2011, among others). On the mono-clausal analysis, wh-phrases in a CWH originate within the same clause and are coordinated with each other, whereas on the bi-clausal analysis, the wh-phrases originate in two different clauses, and the clauses themselves (rather than the wh-phrases) are coordinated. The choice between the two structures for CWHs in a given language is linked to independent factors (i.e. the presence or absence of multiple wh-fronting). Thus, different sets of restrictions on CWHs might only be compatible with a mono-clausal or a bi-clausal structure.

We focus on coordination of wh-pronouns and relative pronouns; however, this type of coordination, in which coordinated items may belong to different syntactic categories, is not limited to wh-elements. This was pointed out by Kallas (1993) and Przepiórkowski and Patejuk (to appear) for Polish, Chaves and Paperno (2007) and Paperno (2012) for Russian, and Grosu (1985, 1987) for English, among others. To illustrate briefly, (6a) involves analogous coordination of negative pronouns, (6b) of universal quantifiers, and (7a-b) of focused phrases.[2]

(6) a. **Nikt** i **nic**, i **nigdy** go nie złamie. *Polish*
no-one.NOM and nothing.ACC and never him not break
'Lit. Noone and nothing and never will break him.'
(Przepiórkowski and Patejuk *to appear*, citing Kallas 1993)

b. **Vse** i **vsyo** znayut. *Russian*
everyone.NOM and everything.ACC knows
'Everyone and everything knows.' (Chaves and Paperno 2007:48)

(7) a. John eats **only pork** and **only at home**.
b. John refuses to drink **any whiskey** or **with any mobsters**. (Grosu 1985:232-233)

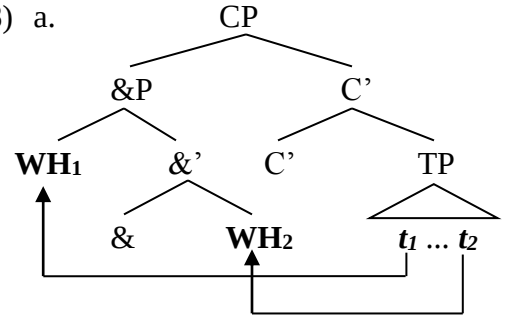
In our previous work, we argued that the availability of a mono-clausal structure for CWHs is contingent on the availability of overt multiple wh-fronting. The two wh-phrases originate within the same clause, move to the left-peripheral position, and only in this derived position do they become coordinated with each other, as shown in (8a).[3] Thus, in MWH languages, the structure of a CWH in many ways parallels the structure of regular (non-coordinated) multiple wh-questions, given in (8b).[4]

[2] For Grosu (1985, 1987), focus is the licensing condition for this type of coordination.

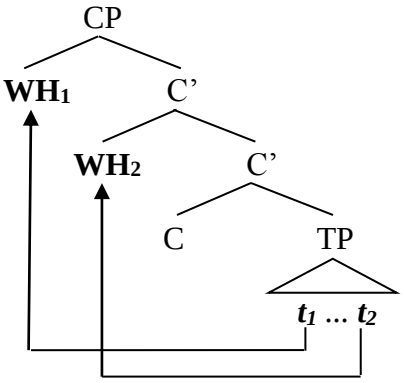
[3] Different implementations of this idea exist in the literature. Zhang (2007) argues that (8a) is derived by sidewards movement of both wh-phrases to &P, which is later merged as the specifier of the CP that the wh-phrases originated from. Merchant (2008), on the other hand, proposes that each wh-phrase at the left periphery of the clause occupies a distinct specifier of the same C head, and that the conjunction is a spurious coordinator which actually functions as a discourse marker.

[4] We abstract away from variation within the class of multiple wh-fronting languages regarding the landing site for fronted wh-phrases in multiple wh-questions, and use [Spec,CP] throughout the paper. As is well-known since Rudin's (1988) seminal work, in some MWH-languages, wh-phrases do indeed target [Spec,CP] positions, whereas in others

(8) a. **CWH**



b. **MWH**



In both (8a) and (8b), the heads involved in wh-fronting (i.e. the phase heads C and *v*, triggering movement to their respective specifiers, which constitute phase edges), have to be able to attract multiple wh-phrases.[5] Both representations involve the same type of crossing (or nesting) wh-dependencies, and in both wh-phrases are clause-mates. The structure of CWHs in (8a) thus captures the parallelism between multiple wh-questions (MWH) and coordinated wh-questions (CWH) with respect to the following diagnostics: (i) superiority effects (or the lack thereof), (ii) compatibility with two argument wh-phrases, and (iii) compatibility with obligatorily transitive verbs.

First, in MWH languages under consideration, neither multiple wh-questions nor coordinated wh-questions obey superiority, as shown in (9-10) for Polish and in (11-12) for Croatian:

(9) a. **Kogo** **gdzie** Jan zobaczył? *Polish*
who.ACC where Jan saw
'Whom did Jan see where?'

b. **Gdzie** **kogo** Jan zobaczył?
where who.ACC Jan saw
'Where did Jan see whom?'

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they target lower positions. The parallelism between multiple wh-questions and mono-clausal coordinated wh-questions holds irrespective of whether the wh-phrases in both target [Spec,CP] or some lower position.

[5] Haida and Repp (2011) pursue this parallelism even further, by arguing that the derivation of a CWH literally builds on the derivation of a MWH in that wh-phrases in a CWH first land as multiple specifiers of little *v* and subsequently move both upwards (to multiple specifiers of the Focus head) and sidewards (à la Zhang 2007) to form the coordination phrase, which is then inserted as the specifier of the C.

(10) a. **Kogo i gdzie** Jan zobaczył? *Polish*
who.ACC and where Jan saw
Lit. 'Who and where did Jan see?'
b. **Gdzie i kogo** Jan zobaczył?
where and who.ACC Jan saw
Lit. 'Where and whom did Jan see?'

(11) a. **Kako koga** zove? *Croatian*
how who.ACC calls
'How is (s)he calling whom?'
b. **Koga kako** zove?
who.ACC how calls
'Whom is (s)he calling how?'

(12) a. **Kako i koga** zove? *Croatian*
how and who.ACC calls
Lit. 'How and whom is (s)he calling?'
b. **Koga i kako** zove?
who.ACC and how calls
Lit. 'Whom and how is (s)he calling?'

Second, both CWHs and MWHs may contain two wh-arguments, as shown in (13a-b) for Polish and in (14a-b) for Croatian.

(13) a. **Co komu** Jan dał? *Polish*
what.ACC who.DAT Jan gave
'What did Jan give to whom?'
b. **Co i komu** Jan dał?
what.ACC and who.DAT Jan gave
Lit. 'What and to whom did Jan give?'

(14) a. **Kome što** Jan pjeva? *Croatian*
who.DAT what.ACC Jan sings
'For whom is Jan singing what?'
b. **Kome i što** Jan pjeva?
who.DAT and what.ACC Jan sings
Lit. 'What and for whom is Jan singing?'

And third, even if only one of wh-phrases is a direct object, the verb may be obligatorily transitive, as shown in (15a-b) for Polish and in (16a-b) for Croatian. Again, in this respect CWHs parallel MWHs.

(15) a. **Co kiedy** Jan naprawił? *Polish*
what.ACC when Jan fixed
Lit. 'What when did Jan fix?'

b. **Co** **i** **kiedy** Jan naprawił?
what.ACC and when Jan fixed
Lit. 'What and when did Jan fix?'

(16) a. **Što** **kada** Jan popravlja? *Croatian*
what.ACC when Jan fixes
Lit. 'What when is Jan fixing?'
b. **Što** **i** **kada** Jan popravlja?
what.ACC and when Jan fixes
Lit. 'What and when is Jan fixing?'

This parallelism between CWHs and MWHs follows naturally from the mono-clausal structures in (8a-b). The two types of questions involve the same type of crossing vs. nesting dependencies, hence the same behavior with respect to superiority. Since the two wh-phrases start out within the same clause, they can both be arguments of the same verb. Likewise, it is not a problem if the verb is obligatorily transitive and one of the wh-pronouns is an adjunct (as in (15) and (16)), since the other wh-pronoun, the direct object, can still fulfill the subcategorization requirements of the verb in question.

The behavior of CWHs in English with respect to the same diagnostics is quite different in ways that suggest a bi-clausal structure instead. Since English is not a multiple wh-fronting language, we do not expect its C and *v* heads to be able to attract more than one wh-phrase. The properties of CWHs themselves also point towards the unavailability of a mono-clausal structure. First, coordination of two arguments (of the same verb) is disallowed, as shown in (17a). This suggests a bi-clausal structure, in which the ungrammaticality of (17a) reduces to the ungrammaticality of (17b).[6]

(17) a. ***What and where** did John put?
b. ***What** did John put and **where** did John put?

Second, if only one of the wh-phrases is an adjunct, the verb cannot be obligatorily transitive, as shown by the contrast between the ungrammatical CWH with the obligatorily transitive verb *devour* and the grammatical one with the optionally transitive *eat*:

(18) a. ***What and when** did John devour?
b. **What and when** did John eat?

Again, on a bi-clausal structure, the contrast between (18a) and (18b) reduces to the contrast between (19a) and (19b):[7]

[6] Since English fronts only one wh-phrase overtly, we do not compare the behavior of its CWHs and MWHs.

[7] As pointed out to us by one of the reviewers, the relevant factor is the obligatory versus optional status of the element rather than nominal versus adverbial status of the coordinated wh-phrases. In (17) above, both *what* and *where* are obligatorily selected by the verb *put*. However, coordination of two arguments is also in principle possible, as long as both arguments are optional. Whitman (2004), for example, points out that this is the case with verbs like *serve*:
(i) Who and what did Kim serve? (Whitman 2004:428)
The verb *give* behaves similarly in that in certain fairly restricted contexts (typically involving charity giving) it allows only a single argument, as in (ii):
(ii) John gives 20 dollars (whenever he is asked to contribute to a worthy cause).

(19) a. *__What__ did John devour and __when__ did John devour?
b. __What__ did John eat and __when__ did John eat?

And finally, the wh-phrases in a CWH do not show superiority effects:

(20) a. __What__ and __why__ does John sing?
b. __Why__ and __what__ does John sing?

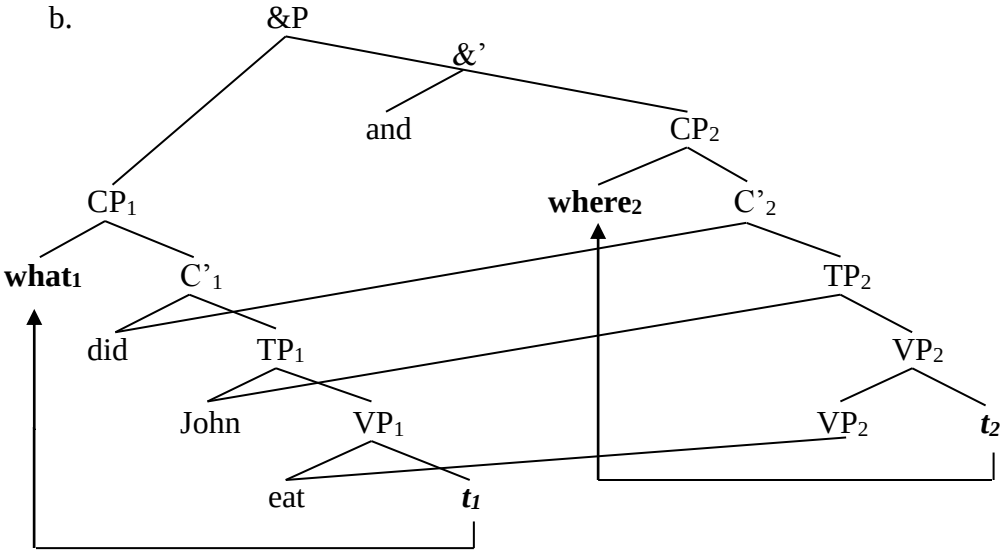
We attribute the behavior of English CWHs to a bi-clausal structure, in which each wh-phrase is fronted within its own clause and the two clauses, each containing a single wh-pronoun and a single instance of wh-movement, are coordinated at the CP level. Existing implementations of a bi-clausal analysis differ in how the surface string is derived from such coordination of two clauses. Bánréti (1992), Browne (1972), Giannakidou and Merchant (1998), Lipták (2011), Raţiu (2012), Tomaszewicz (2011), and Whitman (2002) propose that CWHs involve ellipsis of the TP in the first conjunct, as shown in (21a). By contrast, Gračanin-Yuksek (2007) and Citko and Gračanin-Yuksek (2013) argue for an analysis of English CWHs in which everything except the two wh-phrases is literally shared between the two conjuncts, as shown in (21b). Following Citko and Gračanin-Yuksek (2013), we refer to this structure as a *bi-clausal sharing structure*.[8]

(iii) John gives to the poor (whenever he is convinced that the recipient IS poor).
To the extent that are (ii-iii) are possible, the coordinated variant in (iv), with the paraphrase in (v), also becomes possible (in the same restricted context):
(iv) To whom and what does John usually give?
(v) To whom does John usually give and what does John usually give?
Example (iv), however, is ungrammatical if it describes a single event of John usually giving something to someone. We thank an anonymous reviewer for bringing these two options involving the verb *give* to our attention and providing the relevant examples.

[8] The structure in (21b) is not the only possible bi-clausal sharing structure for CWHs. Citko (2013), Citko and Gračanin-Yuksek (2013), and Raţiu (2011) also posit a different structure, in which the entire *v*P or TP (containing both wh-phrases underlyingly) is shared between the two conjunct CPs. In Citko and Gračanin-Yuksek (2013), this structure was proposed for Romanian, whose CWHs behave differently from both English, as well as from Polish and Croatian CWHs. Since Romanian is not our focus here, we will not discuss this structure and refer the interested reader to Citko and Gračanin-Yuksek (2013) for relevant data and analysis.

(21) a. [$_{\&P}$ [$_{CP}$ **what$_1$** ~~did John eat t_1~~] and [**where$_2$** did John eat t_2]?

b.



The ellipsis analysis of the kind given in (21a) has been criticized by many researchers (see Gračanin-Yuksek 2007, Kazenin 2002, among others), who show that the non-pronunciation of material in a CWH does not display the properties normally associated with ellipsis. For example, this analysis does not explain why ordering restrictions and co-occurrence restrictions are different in CWHs and other, perhaps more standard clausal ellipsis cases.[9]

We have thus established that there are at least two different structures for CWHs; one mono-clausal ((8a)) and one bi-clausal ((21b)). Following Citko and Gračanin-Yuksek (2013) and Gračanin-Yuksek (2007), we used three diagnostics to determine whether coordinated wh-questions in a given language involve a mono-clausal or a bi-clausal structure. The diagnostics involved multiple wh-fronting, superiority effects and compatibility with obligatorily transitive verbs. Using these diagnostics, we concluded that English CWHs allow only the bi-clausal structure in (21b), i.e. they involve a coordination of CPs and the term 'wh-coordination' is a misnomer, as the 'coordinated' wh-phrases do not belong to the same clause at any level of representation. Instead, each is fronted within its own clause. The properties of CWHs in Croatian and Polish, on the other hand, suggest that these two languages, more generally languages with multiple overt wh-fronting, allow a mono-clausal structure.[11] In other words, whether a language is a MWH language or not determines what kind of CWHs may exist in that language. Mono-clausal CWHs are only possible in MWH languages, where they are derived by a mechanism that builds on the mechanism that derives regular (non-coordinated) multiple wh-questions.

Keeping in mind this background on CWHs and the crosslinguistic variation they involve, we turn our attention to relative clauses. This is our focus in the next section, where we examine multiple free and headed relative clauses in which the relative pronouns are *not* coordinated. In

[9] We find the arguments convincing and will not consider the elliptical structure in (21a) as a possible structure for bi-clausal CWHs. We refer the interested reader to Kazenin (2002) for data and discussion.

[11] This does not mean that bi-clausal CWHs in multiple wh-fronting languages are necessarily impossible. For example, the behavior of CWHs with respect to superiority in Polish and Croatian is in principle compatible with both a mono-clausal and a bi-clausal structure. However, since these languages do not show superiority either in non-coordinated or coordinated wh-questions, as shown in (9) through (12), the lack of superiority in CWHs cannot be taken as evidence for a bi-clausal structure the way it is in English.

Section 4, we discuss the effects of coordination on the grammaticality of these two kinds of multiple relative clauses.

3. Multiple (Free) Relative Clauses

We begin our discussion of multiple relative clauses by examining the possibility of multiple wh-pronouns in free relatives. We first establish that free relatives disallow multiple relativization out of a single clause. Next, we show that headed relative clauses display the same behavior. We dub this condition the *Single Relative Pronoun Restriction*. Towards the end of the section, we derive this restriction from independent assumptions about the syntax and semantics of relative clauses (as opposed to wh-questions).

3.1. The Single Relative Pronoun Restriction

Despite the fact that FRs and wh-questions are alike in many respects, their behavior diverges when the structure involves multiple non-coordinated wh-phrases. Perhaps not surprisingly, FRs with multiple fronted wh-phrases are ungrammatical in English, as pointed out by Citko (2009), Gawron (2001), Grosu (2003), Grosu and Landman (1998), Huddleston and Pullum (2002), Izvorski (2000), Van Riemsdijk (2006), among others.[12] This is illustrated in (22a-b). The grammaticality of corresponding singular free relatives in (23a-b) shows that the extra wh-pronoun is the culprit.[13]

(22) a. *John eats **what(ever) when(ever)** Peter cooks.
b. *John eats **when(ever) what(ever)** Peter cooks.

(23) a. John eats **what(ever)** Peter cooks.
b. John eats **when(ever)** Peter cooks.

It is, however, somewhat more surprising that multiple FRs are impossible even in languages which *do* allow multiple wh-fronting, as shown in (24a-b) for Polish and in (25a-b) for Croatian.[14]

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[12] Van Riemsdijk (2006) notes that adjunct (concessive) FRs can sometimes contain multiple wh-phrases, as in (i). Izvorski (2001) demonstrates the same for Bulgarian.
(i) Whichever CD you buy in whatever store, you always pay too much.
Izvorski (2001) analyzes concessive FRs as bare adjunct CPs. As mentioned in the Introduction and as we will see in what follows, we attribute the ill-formedness of FRs with multiple wh-pronouns to the presence of a CP external head in FRs, which is absent from wh-questions. If concessive FRs also lack an external head, the fact that they allow multiple wh-pronouns is not surprising.

[13] That it is indeed the presence of an extra wh-pronoun, rather than illicit multiple wh-movement that rules out these examples is shown by the fact that they remain ungrammatical even if only one wh-phrase is fronted, as shown in (ia-b).
(i) a. *John eats **what(ever)** Peter cooks **when(ever)**.
b. *John eats **when(ever)** Peter cooks **what(ever)**.

[14] Rudin (2006) argues that Romanian and Bulgarian do have multiple FRs, based on examples like (i).
(i) Vzemajte **koj** **kakvoto** može. *Bulgarian*
take.IMP who.NOM what.ACC can
'Everyone take whatever you can.' (Rudin 2006: 290)
We believe that the construction in (i) is not a typical free relative. For example, in a free relative, the wh-pronoun has to be construed simultaneously with *both* the matrix and the embedded predicate. Thus, in (ii) *what* is understood as the object of both *take* and *give*.

(24) a. *Jan je **co(kolwiek)** **kiedy(kolwiek)** Piotr gotuje. *Polish*
Jan eats what(ever).ACC when(ever) Piotr cooks
Lit. 'Jan eats whatever whenever Piotr cooks.'
b. *Jan je **kiedy(kolwiek)** **co(kolwiek)** Piotr gotuje.
Jan eats when(ever) what(ever).ACC Piotr cooks
Lit. 'Jan eats whenever whatever Piotr cooks.'

(25) a. *Jan jede **što(god)** **kad(god)** Ivan kuha. *Croatian*
Jan eats what(ever).ACC when(ever) Ivan cooks
Lit. 'Jan eats whatever whenever Ivan cooks.'
b. *Jan jede **kad(god)** **što(god)** Ivan kuha.
Jan eats when(ever) what(ever).ACC Ivan cooks
Lit. 'Jan eats whenever whatever Ivan cooks.'

Again, singular free relatives with the same wh-pronouns are fine in both languages:

(26) a. Jan je **co(kolwiek)** Piotr gotuje. *Polish*
Jan eats what(ever).ACC Piotr cooks
'Jan eats whatever Piotr cooks.'
b. Jan je **kiedy(kolwiek)** Piotr gotuje.
Jan eats when(ever) Piotr cooks
'Jan eats whenever Piotr cooks.'

(27) a. Jan jede **što(god)** Ivan kuha. *Croatian*
Jan eats what(ever).ACC Ivan cooks
'Jan eats whatever Ivan cooks.'
b. Jan jede **kad(god)** Ivan kuha.
Jan eats when(ever) Ivan cooks
'Jan eats whenever Ivan cooks.'

The fact that a free relative cannot contain two relative pronouns illustrates a more general prohibition against multiple relativization from a single clause. We argue that this is simply because a free relative, unlike a wh-question, has a head. Thus, multiple free relatives are ill-formed because they necessarily involve the configuration in (28), in which a single null head (marked as Ø), is

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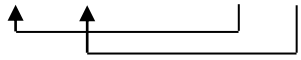
(ii) I will take *what* you can give me.
This is *not* what happens in examples like (i). In the parallel Croatian example in (iii), the matrix clause contains an additional nominative subject *svi* 'all', while the wh-phrase *tko* 'who' is satisfying the selectional requirements of only the embedded verb *može* 'can'. Thus, only one of the two wh-phrases is construed with both the matrix and the embedded predicate (Dimova 2014 shows that in Bulgarian, it is always the second wh-phrase). For the time being, we leave the precise analysis of such constructions open. What matters for us is that they are *not* free relatives. We thank one of the reviewers for a discussion of this construction.

(iii) Svi uzmite **tko** **što** može. *Croatian*
all.NOM take.IMP.2PL. who.NOM what.ACC can.3SG.
'Everyone take whatever you can.'

modified by a single relative CP containing two relative pronouns.[15] This is irrespective of whether both wh-pronouns front overtly (something we might expect to be possible in languages that front all wh-pronouns overtly in wh-questions), or one of them fronts overtly and the other one covertly (the more likely scenario in a language like English).

(28) *[$_{FR}$ Ø [$_{CP}$ **wh$_1$** **wh$_2$** [$_{TP}$ .... ***t$_1$*** ... ***t$_2$***]]]



Note that in the multiple FRs we have seen so far, in (22), (24), and (25), one of the wh-phrases, namely *whatever*, is a DP, while the other, *whenever*, is an AdvP. As is well-known, the distribution of a free relative is determined by the syntactic category of the wh-phrase that introduces it. This suggests that the null head of a free relative has to belong to the same syntactic category as the wh-phrase. Therefore, the structure in (28) is excluded for these examples, presumably because a single relative clause head cannot be at the same time a DP and an AdvP. However, when the wh-phrases are of the same category, as in (29a-c), then at least in MWH languages, the configuration in (28) should in principle be possible, contrary to fact.[16]

(29) a. *I will talk **to whoever about whoever** John speaks.
b. *Porozmawiam **z kimkolwiek o kimkolwiek** Jan rozmawia. *Polish*
talk.PERF with whoever.INSTR about whomever.INSTR Jan talks
Lit. 'I will talk to whomever about whomever Jan talks.'
c. *Razgovarat ću **s kimgod o komegod** Jan priča. *Croatian*
talk.INF will.1SG with whoever.INST about whomever.LOC Jan speaks
Lit. 'I will talk to whomever about whomever Jan speaks.'

Interestingly, this is not a fact just about free relatives. Headed relatives behave similarly in that they also disallow multiple clausemate wh-pronouns modifying a single relative clause head, as shown by the ungrammaticality of the examples in (30a-c).

(30) a. *the student **whom** Mary introduced **to whom**
b. *student **którego któremu** Maria przedstawiła *Polish*
student who.ACC whom.DAT Maria introduced
Lit. 'a student whom to whom Maria introduced'
c. *mladić **kojega kojemu** je Marija predstavila *Croatian*
youth who.ACC whom.DAT AUX Maria introduced
Lit. 'a youth whom to whom Marija introduced'

Thus the broader generalization seems to be that the grammar bans structures in which a *single* head (overt or null) is modified by a relative clause with two relativized elements, also noted in previous

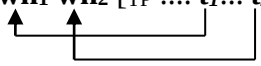
[15] In (28), we adopt the Comp Account of FRs (Gračanin-Yuksek 2008, Groos and Van Riemsdijk 1981, Grosu 1994, among many others), on which a FR has the structure of a CP which modifies a null head. On the Head-Account (Bresnan and Grimshaw 1978, Citko 2002, Larson 1998), the wh-phrase itself is the promoted head of the FR. On the Head Account, multiple FRs are trivially excluded since it is impossible for a single FR to have two heads.

[16] Again, (29a) remains ungrammatical if only one wh-phrase moves, as in (i), so its ungrammaticality cannot be attributed to illicit multiple wh-fronting. If the second wh-phrase moves covertly (as seems standard to assume), (29a) could be thought of as an LF representation of (i).
(i) *I will talk **to whoever** John speaks **about whomever**.

research on relative clauses (see De Vries 2002, Grosu and Landman 1998, and Van Riemsdijk 2006, for example). We refer to this restriction, the restriction against the configuration in (31), as the *Single Relative Pronoun Restriction.*

(31) *Single Relative Pronoun Restriction*

*[$_{DP}$ **HEAD** [$_{CP}$ [$_{\&P}$ **wh$_1$ wh$_2$** [$_{TP}$ .... ***t$_1$***... ***t$_2$***]]]]



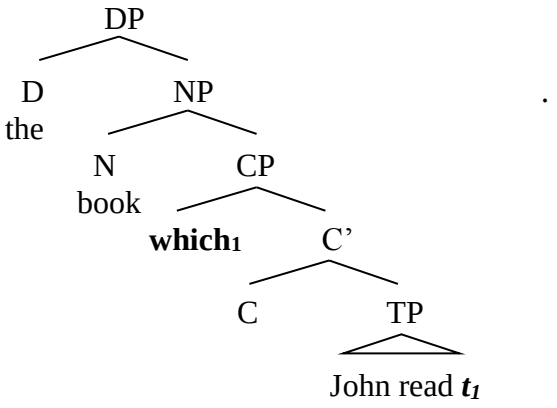
In what follows, we show that this restriction is due to independently motivated assumptions about the syntax of relative clauses (i.e. impossible promotion) and/or to independently motivated assumptions about the semantics of relative clauses (i.e. the illicit way the relative CP would have to semantically combine with the head).[17]

3.2. Deriving the Single Relative Pronoun Restriction

We start with what we take to be a simple fact about the syntax of relative clauses, the fact that relative clauses, including free relative clauses, are *headed* in that they involve a CP external DP projection (irrespective of how this CP external head ends up in this position).[18]

(32) a. the book **which$_1$** John read ***t$_1$***

b.



.

Furthermore, we assume a fairly standard semantics for relative clauses (going back "at least to Quine", according to Heim and Kratzer 1998), in which the relative CP combines with the head that it modifies via Predicate Modification. This is made possible by the operation of Predicate Abstraction that applies first inside the relative CP, turning it into an open proposition of type <e,t>. Now the relative CP can combine with the head through Predicate Modification since both are of the same semantic type (type <e,t>).

[17] We thank Rajesh Bhatt and Toshiyuki Ogihara for helpful discussion of the semantic issues in this section.

[18] In (32b), the head is generated in its surface position (as opposed to being raised there), in line with the so-called Matching Account. Nothing hinges on this assumption; our insights are also compatible with the alternative account, the so-called Head Promotion Account, on which the head raises from the relative clause internal position. We take this to be a welcome result, given the arguments in the literature that both structures and derivations have to be in principle available (see Sauerland 1998, Husley and Sauerland 2006, Henderson 2007, among others).

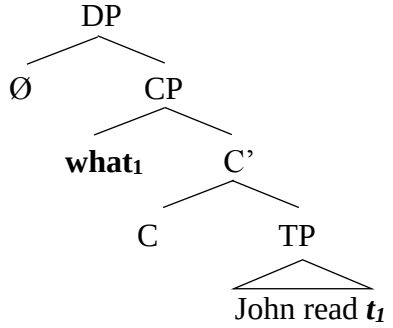
(33) a. the book **which**$_1$ John read t_1

b. [[**which**$_1$ John read t_1]] = λx.read(x)(j)
c. [[book]]= λx.book(x)
d. [[book **which**$_1$ John read t_1]] = λx.book(x) & read(x)(j) (Predicate Modification)
e. [[the]] = λPιx.P(x)
f. [[the book **which**$_1$ John read t_1]] = λPιx.P(x) (λx.book(x) & read(x)(j))
= λPιx.book(x) & read(x)(j)
= ιx.book(x) & read(x)(j) (Functional Application)

We adopt similarly standard assumptions about the syntax and semantics of free relatives. Syntactically speaking, we couch our proposal in terms of the so-called Comp Hypothesis, on which the wh-pronoun occupies the [Spec CP] position and the head is occupied by a null element, as shown in (34b).[19]

(34) a. Maria wrote **what**$_1$ John read t_1.

b. Maria wrote



Semantically, we assume that free relatives are definite descriptions and that the null head ø is an iota operator of Partee (1987), which shifts a property to the individual with this property. This is what allows free relatives to be interpreted as definite descriptions (see Caponigro 2003, Caponigro Pearl, Brooks and Barner 2012, Dayal 1995, Jacobson 1995, Rullman 1995, for more detailed justifications of this general type of semantics for free relatives).[20]

(35) a. [[John read t_1]] = λx.read(x)(j)
b. [[**what**$_1$]] = λP.λx.inanimate(x) & P(x)
c. [[**what**$_1$ John read t_1]] = λP.λx.inanimate(x) & P(x) (λx.read(x)(j))
= λx.inanimate(x) & read(x)(j) (Functional Application)
d. [[Ø]] = λPιx.P(x)
e. [[Ø **what**$_1$ John read t_1]] = λPιx.P(x) (λx.inanimate(x) & read(x)(j))
= ιx.inanimate(x) & read(x)(j) (Functional Application)

[19] Our insights are also compatible with the Head Hypothesis. However, we *do* depart from accounts that treat free relatives as bare CPs (cf. Rooryck 1994, Jacobson 1995, Caponigro 2003).
[20] The derivation in (35) follows most closely Caponigro's (2003) and Caponigro Pearl, Brooks, and Barner's (2012) analysis, especially with respect to the semantic contribution of wh-pronouns like *what.*

With this background on the structure and interpretation of both headed and free relatives, let us come back to the cases of ungrammatical multiple relatives of the kind we saw in (30). The relevant example is repeated in (36) below.[21]

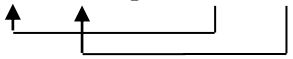
(36) *the student **whom**$_1$ **to whom**$_2$ Mary introduced ***t*$_1$ ***t*$_2$

In (36), both of the wh-phrases inside the relative clause are arguments of the same verb, i.e. they must originate inside the same *v*P. A parallel free relative is given in (37) below. Here, too, both wh-phrases are arguments of both the matrix verb *introduced* and the embedded verb *showed*.

(37) *Mary introduced **whomever**$_1$ **to whomever**$_2$ John showed ***t*$_1$ ***t*$_2$

The headed relative in (36) and the free relative in (37) both involve the configuration in (31), repeated here as (38), i.e. they both violate the Single Relative Pronoun Restriction. We next turn to the question of what excludes (38).[22]

(38) *[**HEAD** [$_{FR}$ **wh**$_1$ **wh**$_2$ [$_{TP}$ .... ***t*$_1$ ... ***t*$_2$]]]



What distinguishes relative clauses with multiple wh-pronouns from regular headed relatives (with a single wh-pronoun) is that Predicate Abstraction applies twice, once per each moved wh-phrase. Consequently, the semantic type of a relative clause with two wh-pronouns is <e,<e,t>>, as shown in (39b). Predicate Modification, however, cannot combine a constituent of this type with the head, which is of type <e,t>, as shown in in (39d).[23]

(39) a. the student **whom**$_1$ **to whom**$_2$ Mary introduced ***t*$_1$ ***t*$_2$
b. [[**whom**$_1$ **to whom**$_2$ Mary introduced ***t*$_1$ ***t*$_2$]] = λx.λy.introduce (x)(y)(m)
c. [[student]] = λx.student(x)
d. [[student **whom**$_1$ **to whom**$_2$ Mary introduced ***t*$_1$ ***t*$_2$]]
≠ λx.student(x) & introduce(x)(y)(m) (Predicate Modification impossible)

One of the reviewers suggests that the relative clause of the type <e,<e,t>> could in principle combine with the head of the type <e,t> through some version of Generalized Predicate Modification. Generalized Predicate Modification was proposed by, for example, Winter (1996), Gazdar (1980), Keenan and Faltz (1985), and Partee (1987), as a mechanism which allows constituents that display this kind of mismatches to semantically combine with each other, yielding

[21] We continue to use English merely for illustrative purposes to also represent comparable (also ungrammatical) relative clauses in MWH languages. As noted above, the English examples in (36) and (37) are also excluded as a multiple wh-movement violation. Crucially, however, the status of such examples does *not* improve if only one wh-phrase moves, as shown in (i-ii):
(i) *the student **whom**$_1$ Mary introduced ***t*$_1$ **to whom**
(ii) *Mary introduced **whomever**$_1$ John showed ***t*$_1$ **to whomever.**
[22] We thank an anonymous reviewer for bringing our attention to considerations discussed in the following paragraphs. Special thanks go to Rajesh Bhatt for his helpful comments and suggestions.
[23] As pointed out by one of the reviewers, the same problem arises even if the same variable is used in each abstraction step, generating λx.λx.[…x…x…]. The resulting expression would still be of the type that cannot combine with the head of the relative clause, which is of type <e,t>.

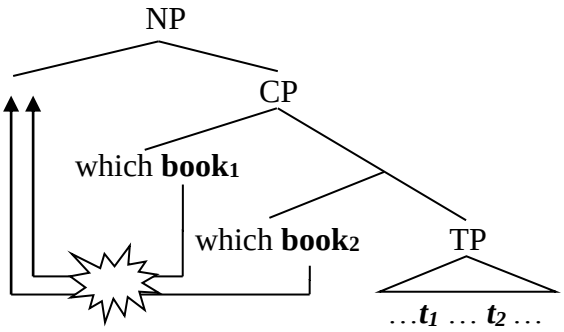
an expression of the type <e,<e,t>>, as shown in (40).

(40) a. the student **whom$_1$ to whom$_2$** Mary introduced ***t$_1$ t$_2$***
b. [[**whom$_1$ to whom$_2$** Mary introduced ***t$_1$ t$_2$***]] = λx.λy.introduce (x)(y)(m)
c. [[student]] = λx.student(x)
d. [[student **whom$_1$ to whom$_2$** Mary introduced ***t$_1$ t$_2$***]]
= λx.λy.student(x) & introduce(x)(y)(m) (Generalized Predicate Modification)

However, this would still not save the derivation since an expression of type <e,<e,t>> cannot combine with the relative clause external determiner, which requires something of the type <e,t>. One way in which the semantic requirements of the determiner could be satisfied is to apply a detransitivizing type-shifter (Barker 2011) to the expression in (40d), which would allow it to combine with the determiner. Such type-shifters are posited for the treatment of relational nouns (such as *husband*), when they are not accompanied by an overt possessor. The type-shifter turns a relational noun into a non-relational one by existentially closing the variable which would normally be interpreted as the possessor. Thus, after the detransitivization applies, the interpretation of the relational noun *husband*, used without the overt possessor, is something like 'the person x such that there is a person y such that x is the husband of y.' If such a detransitivizing type-shifter could apply to the constituent consisting of a head noun modified by a multiple relative clause, i.e. to the expression in (40d), the structure would be interpreted as 'a person x such that x is a student and there is a person y such that Mary introduced x to y.' This meaning is, however, not available. Instead, the structure is simply ungrammatical. We take this to mean that the expression consisting of the head noun modified by a relative clause cannot be detransitivized. This is presumably because the detransitivizing type-shifter is not freely available to just any expression (it may be an option for a subset of lexical items, namely, relational nouns) and when it does apply, it applies before the noun combines with any modifiers. However, for detransitivization of this sort to save the structure that involves a relative clause with multiple relative pronouns, the type-shifter would have to apply at the point in the derivation at which the head noun has already combined with the relative clause that modifies it. Since this is impossible, we conclude that the detransitivization does not apply, and the structure fails to receive a semantic interpretation, which results in ungrammaticality. Thus, the Single Relative Pronoun Restriction is a consequence of a semantic violation that obtains in the composition of the meaning of a structure that contains a relative clause with more than one relative pronoun.

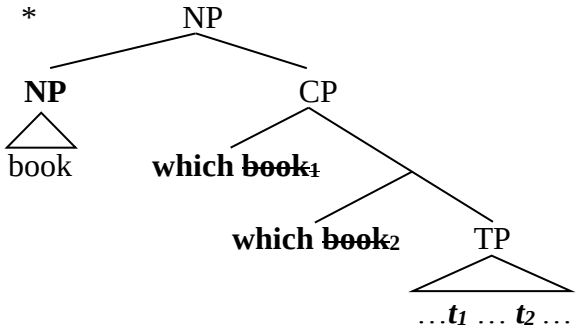
Next, we turn to the question of whether relative clauses with multiple wh-pronouns can also be ruled out syntactically. We believe that the answer is yes. The ungrammaticality of such relatives falls out quite straightforwardly from the Head Promotion analysis of relative clauses. Since on this analysis, the head is promoted from within the relative clause, the existence of multiple heads creates problems for the promotion of the head. In particular, because the heads originate within the wh-phrases, which in multiple wh-languages presumably occupy multiple specifiers of the relative CP, as shown in (41), the question arises as to which of the multiple heads should be promoted and what happens to the remaining one(s). Since the configuration does not involve a coordinate structure, Across-the-Board (ATB) movement, which could in principle move both heads simultaneously, is not an option and the structure ends up being ungrammatical. This is illustrated in (41).

(41) *



On the Matching Account, however, we need a different mechanism to exclude the configuration in (42), in which two CP internal heads are deleted under identity with a single external head.

(42) *



In order to exclude such a structure, we appeal to the observation that the number of chains headed by a relative operator cannot 'exceed' the number of external heads. Since there is only one external head, there can only be one operator-variable chain within the relative clause.[24]

Before we turn to relative clauses in which relative pronouns are coordinated, it is worth addressing the possibility that what is responsible for the Single Relative Pronoun Restriction is a crossover effect. The reasoning goes as follows: if in a multiple relative clause the head identifies both variables (in the positions of the gaps), it means that the head is co-indexed with both wh-phrases. This in turn means that the two wh-phrases are co-indexed with each other, which leads to a Strong Crossover effect (SCO); one wh-phrase (*to whom*) crosses over the trace of the other

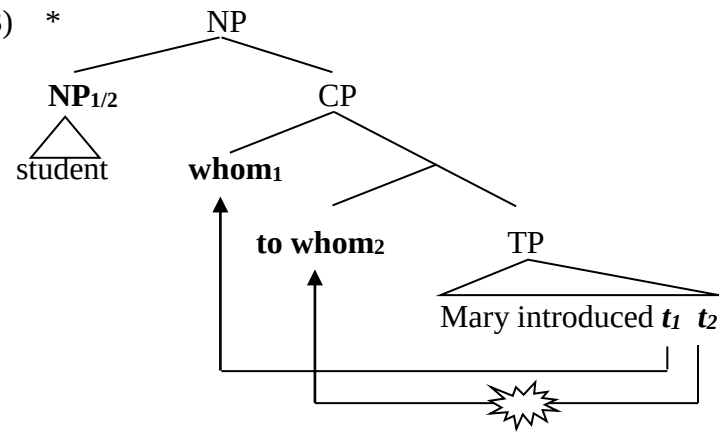
[24] We leave the details of the syntactic mechanism that might account for this observation open. We saw above that the structure in (42) is ruled out independently for semantic reasons. We might also rule it out on syntactic grounds by appealing to the Extended Bijective Principle of Wiltschko (1998), given in (i) below.

(i) *Extended Bijective Principle*
There is a bijective correspondence between an operator-variable chain and a range. (That is, each operator must A'-bind exactly one variable, and each variable must be bound by exactly one operator, and for each operator-variable chain there must be exactly one range.) (Wiltschko 1998:169)

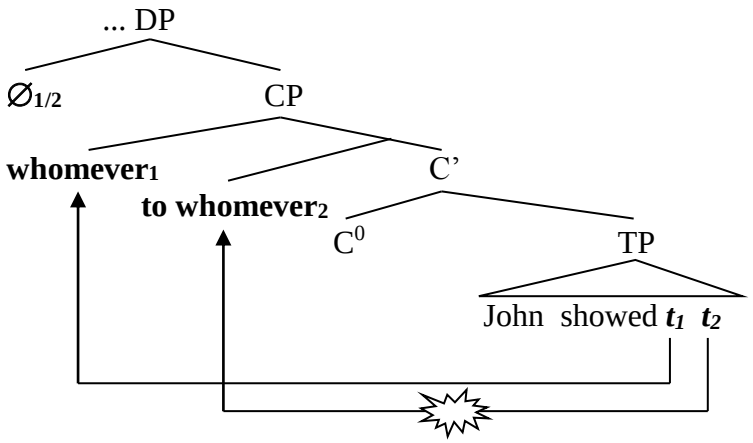
On the Matching Account, the range is defined by the internal head (contained within the wh-phrase), deleted under the identity with the external head. Crucially, we assume that the range defined by the internal (deleted) head has to be identical to the range defined by the external head. Thus, in a relative clause with a single relative pronoun, there is a one-to-one correspondence between the number of operator-variable chains and the number of ranges regardless of what analysis of relative clauses one adopts. If, on the other hand, a relative clause contains more than one operator-variable chain (i.e. if it contains multiple relative pronouns), but contains a single range (provided by a single head), we have a mismatch between the number of operator-variable chains (two or more) and the number of ranges (a single one). Such relative clauses are thus excluded by the principle in (i) on both approaches to the derivation of relative clauses.

(*whom*), which it is c-commanded by. This is schematically represented in (43) for headed relatives, and in (44) for free relatives.

(43) *



(44) Mary introduced ...



Although crossover may be appealing as the source of the Single Relative Pronoun Restriction, there are reasons to believe that the restriction is not due to SCO effects. As pointed out by one of the reviewers, if relative clauses with multiple relative pronouns are degraded because they exhibit a SCO effect, we would expect relative clauses like those in (45a), with the LF structure in (45b), to improve, given that in such cases wh-phrases are embedded and would yield a Weak Crossover, rather than a Strong Crossover effect. This is, however, not what we find: the examples in (45) are just as degraded as the ones in which wh-phrases are not embedded. We thus agree with the reviewer that crossover effects are not responsible for the Single Relative Pronoun Restriction.[25]

(45) a. *a man **[whose brother]**$_1$ Mary showed ***t*$_1$ **[whose pictures]**
b. *a man **[whose brother]**$_1$ **[whose pictures]**$_2$ Mary showed ***t*$_1$ ***t*$_2$

[25] Crucially, we are not claiming that crossover *never* plays a role in relative clauses. The contrast between the (a) and (b) examples below provides a straightforward illustration of crossover.

(i) a. *The man **who**$_1$ he$_1$ likes **t**$_1$
b. ??The man **who**$_1$ his$_1$ mother likes **t**$_1$

To sum up the discussion so far, we derived the Single Relative Pronoun Restriction from more basic principles. We attributed this restriction to the following sources: the way in which semantic composition of a multiple relative clause proceeds and the fact that on the Head Promotion analysis, the configuration would allow only one of the heads to be promoted, leading to ill-formedness.

To conclude the discussion of relative clauses with multiple relative pronouns, we note that non-coordinated multiple relative pronouns are disallowed not only in free and headed relative clauses in which wh-phrases are both arguments, like in (36) and (37), but also in those where one is an argument and the other an adjunct, as well as in those where both wh-phrases are adjuncts. The latter two cases are illustrated in (46) and (47) below.

(46) a. *the boy **who** spoke **about whom**
b. *Mary saw **whoever** John photographed **with whomever**.

(47) a. *the house **in which** Mary sang **about which**
b. *John will move **wherever** Sally moves **whenever**.

Before we turn to relative clauses with coordinated wh-pronouns and the ameliorating effects that coordination sometimes (but crucially, not always) has on the grammaticality of such relatives, let us point out an interesting prediction that our account makes. We have argued in this section that the reason relative clauses with multiple wh-pronouns are ungrammatical is the presence of the CP external relative clause head, which leads to both syntactic and semantic problems if the relative CP contains two relative pronouns. This makes a straightforward prediction that if relative clauses *without* external heads are possible, they should allow multiple relative pronouns.[26] This prediction is confirmed, as shown by the grammaticality of correlatives and so-called modal existential wh-constructions, both of which have been independently argued to involve bare CPs (see, for example, Dayal (1996) on the former and Caponigro (2003) on the latter). Examples in (48) below illustrate correlative clauses with multiple CP internal relative phrases, and those in (49) modal existential wh-constructions with multiple (also CP internal) wh-

[26] We thank an anonymous reviewer for bringing this prediction to our attention. The same reviewer also points out that Japanese internally headed relatives allow multiple heads (see Ito 1986 for representative discussion), as shown by the example in (i) below with the heads given in bold. While a complete analysis of internally headed relative clauses would take us too far away from the topic of the paper (i.e. the effect of coordination on the grammaticality of relative clauses with multiple relative pronouns), the presence of multiple heads in (i) is not a problem for our analysis, since neither of the two heads is CP external.

(i) **Zyunsaa-ga** **doroboo-o** kawa-no-boo-e oitumaete-itta-no $e_{i\,j}$]-ga *Japanese*
Policeman-NOM thief-ACC river's direction-toward tracked down-NOM
ikioi amatte huaritomo kawa-no-naka-e tobikonda
power exceed both-two river into jumped
'A policeman was tracking down a thief toward the river, who both, losing control, jumped into the river.'
(Ito 1986:118, citing Kuroda 1975-76)

The analysis of Japanese and Korean multiply headed internally headed relative clauses in Grosu (2010), refined and improved in Grosu and Landman (2012), is also compatible with our proposal. Grosu proposes that in Japanese and Korean internally headed relatives with a single head, predicate abstraction operates not on the internal head itself, but rather on the variable introduced by a null functional category that he calls Choose Role (ChR), which ranges over a particular thematic role in the denoted event. In cases where there are multiple internal heads, ChR is allowed to range over sums of thematic roles, but there is, crucially, still only a single variable that is available for abstraction, so that the type mismatch resulting from the presence of multiple relative pronouns does not arise.

pronouns.[27] The fact that these examples are grammatical provides additional support for our claim that the ultimate source of the Single Relative Pronoun Restriction is the presence of a CP external head in headed and free relative clauses.[28]

.

(48) a. **jo laRkii jis laRke** se baatciit kar rahii thii, *Hindi*
WH girl WH boy with chat do stayed was
ve ek saath sinemaa gaye hayN.
they together movies went are
'Which girl was talking to which boy, they went to the movies together.'
(Grosu and Landman 1998: 165)

b. **Kto co** chce, ten to dostanie. *Polish*
who what want.3SG dem.NOM dem.ACC get.3SG
'Everyone gets what they want.' (Citko 2009: 59)

c. **Na kojto kakvoto** e pisano, tova šte stane *Bulgarian*
to who what is written that will happen
'Whatever is fated for each person, that will happen.' (Rudin 2008: 259)

(49) a. Mam **co komu** dać. *Polish*
I.have what.ACC whom.DAT give.INF
'I have something to give to everyone.'

b. Tady už ti nemá **kdo co** prodat *Czech*
here already you.DAT NEG.has who.NOM what.ACC sell.INF
'Here, nobody can sell you anything anymore.' (Šimík 2011: 44)

c. Imaš li **s kogo kŭde** da otideš? *Bulgarian*
have.2SG Q with who where that go.2SG
'Do you have somewhere to go and someone to go with?' (Rudin 1986: 193)

4. Coordinated Relative Clauses

Our discussion of CWHs in Section 2 established that the coordination of wh-phrases in a CWH may result from a mono-clausal structure (in MWH languages), in which both wh-phrases originate

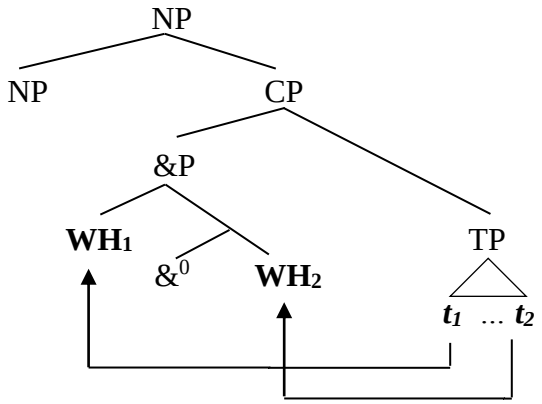
[27] The possibility of multiple wh-pronouns in (49) was first noted by Rudin (1986) for Bulgarian. These constructions have also been referred to as *irrealis free relatives*, *infinitival free relatives* and *existential free relatives* in the relevant literature, which reflects attempts to assimilate them to free relatives. They differ from free relatives in a number of other respects besides allowing multiple wh-pronouns (e.g. lack of matching effects, incompatibility with *ever*, restrictions on the use of relative pronouns and complex wh-pronouns, mood restrictions, existential force; see Šimík 2011 for a comprehensive overview). We follow Pesetsky 1982, Rudin 1986, Grosu 1987, 1994, Izvorski 1998, 2000, Caponigro 2003, Grosu and Landman 1998 in treating them as bare CPs. On such an account, what distinguishes them from free relatives is the lack of a head. However, we differ from Caponigro 2003 in that we do not treat free relatives as bare CPs.

[28] One of the reviewers also points out that this is compatible with Bhatt's (2003) analysis of the difference between Hindi correlatives with single versus multiple relative pronouns in that only correlatives with single relative pronouns are externally headed (with the correlative CP adjoined to the demonstrative inside the main clause and moving to the IP-adjoined position), whereas those with multiple relative pronouns are base generated as IP adjuncts.

in the same clause, or from a bi-clausal structure (in non-MWH languages), in which each wh-phrase originates in its own CP. For a bi-clausal CWH to be grammatical, however, each CP must be well-formed with just a single wh-phrase.

Following the same reasoning we adopted in our investigation of CWHs, in this section we examine whether coordination of wh-phrases in a multiple relative clause is possible, and if so, whether a coordinated relative clause can have both a mono-clausal and a bi-clausal source. Given our discussion of non-coordinated multiple relatives in the previous section, where we saw that multiple relatives are excluded by the Single Relative Pronoun Restriction, we predict that mono-clausal coordinated relative clauses involving the configuration in (50) should be impossible for the same reason; (50) violates the Single Relative Pronoun Restriction.

(50)



In what follows, we will see that this prediction is borne out: coordinated relative clauses, although attested in all three languages we investigate, disallow a mono-clausal structure of the kind given in (50) and require a bi-clausal one instead. We start our investigation with coordinated free relatives (Section 4.1) and turn to coordinated headed relatives in Section 4.2.

4.1. Coordinated Free Relatives

We saw in Section 3 that multiple free relatives are ungrammatical in all languages under consideration. An addition of a conjunction between multiple wh-phrases may, however, result in a fully well-formed sentence, as shown by the contrast between the (a) and (b) examples in (51) through (53) below.

(51) a. *John will eat **whatever whenever** Peter cooks.
b. John will eat **whatever <u>and</u> whenever** Peter cooks.

(52) a. *Jan je **gdziekolwiek cokolwiek** Piotr gotuje. *Polish*
Jan eats wherever whatever.ACC Piotr cooks
Lit. 'Jan eats wherever whatever Piotr cooks.'
b. Jan je **gdziekolwiek <u>i</u> cokolwiek** Piotr gotuje.
Jan eats wherever and whatever.ACC Piotr cooks
'Jan eats wherever and whatever Piotr cooks.'

(53) a. *Ivan jede **štogod** **kadgod** Marija kuha. *Croatian*
Ivan eats whatever.ACC whenever Marija cooks
Lit. 'Ivan eats whatever whenever Marija cooks.'
b. Ivan jede **štogod** **i** **kadgod** Marija kuha.
Ivan eats whatever.ACC and whenever Marija cooks
'Ivan eats whatever and whenever Marija cooks.'

This is not to say that coordination improves *any* free relative with multiple wh-phrases; the free relatives in the (a) examples in (54) through (56) remain ungrammatical irrespective of the presence of coordination, as the (b) examples show.

(54) a. *John will introduce **whoever to whoever** Mary shows.
b. *John will introduce **whoever and to whoever** Mary shows.

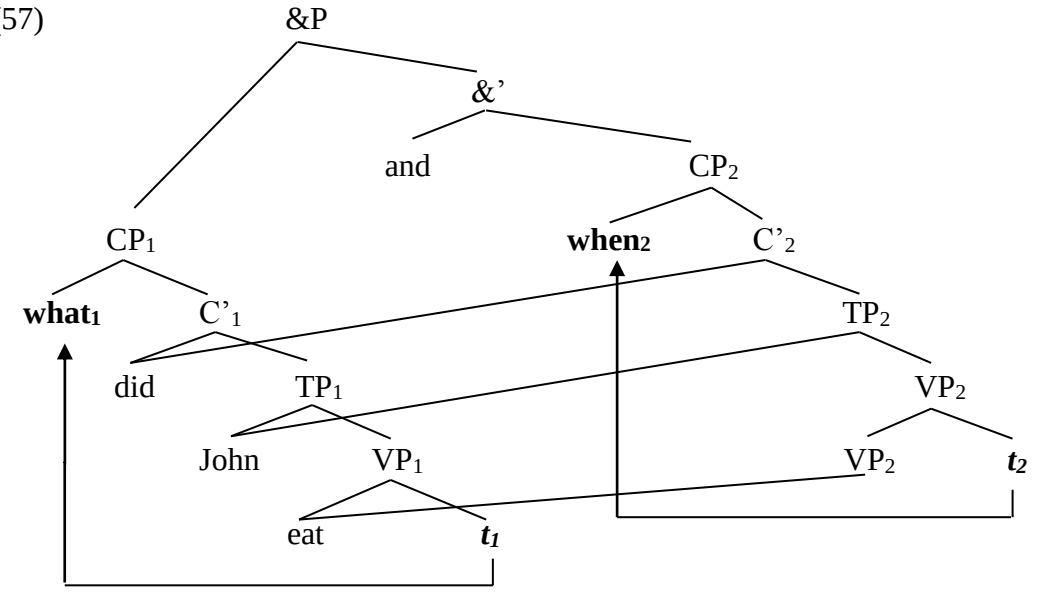
(55) a. *Jan przedstawi **kogokolwiek** **komukolwiek** Maria pokaże. *Polish*
Jan introduces whoever.ACC whoever.DAT Maria shows
Lit. 'Jan will introduce whoever to whomever Maria shows.'
b. *Jan przedstawi **kogokolwiek** **i** **komukolwiek** Maria pokaże.
Jan introducs whoever.ACC and whoever.DAT Maria shows
Lit. 'Jan will introduce whoever and to whomever Maria shows.'

(56) a. *Ivan će predstaviti **kogakod** **komegod** Marija pokaže. *Croatian*
Ivan will introduce whoever.ACC whomever.DAT Marija shows
Lit. 'Ivan will introduce whoever to whoever Marija shows.'
b. *Ivan će predstaviti **kogakod** **i** **komegod** Marija pokaže.
Ivan will introduce whoever.ACC and whomever.DAT Marija shows
Lit. 'Ivan will introduce whoever and to whoever Marija shows.'

What distinguishes the ungrammatical (b) examples in (54-56) from the grammatical (b) examples in (51-53) is the nature of the coordinated wh-phrases: in all the ungrammatical cases, the two coordinated wh-pronouns are both arguments. This shows that coordination of two argument wh-phrases in a free relative is always disallowed, whereas coordination of a wh-argument with a wh-adjunct is allowed.[30] This parallels the conditions that English CWHs are subject to: they disallow coordination of arguments, but allow coordination of an argument with an adjunct (or two adjuncts). We showed above (Section 2) that these restrictions on English CWHs follow from a bi-clausal structure of the kind given in (57), in which each conjunct contains a single wh-phrase.

[30] Coordination of two adjuncts is possible in all three languages, as illustrated below for English.
(i) John eats **whenever and wherever** Peter cooks.
As we will see in (59), this fact also follows from our analysis.

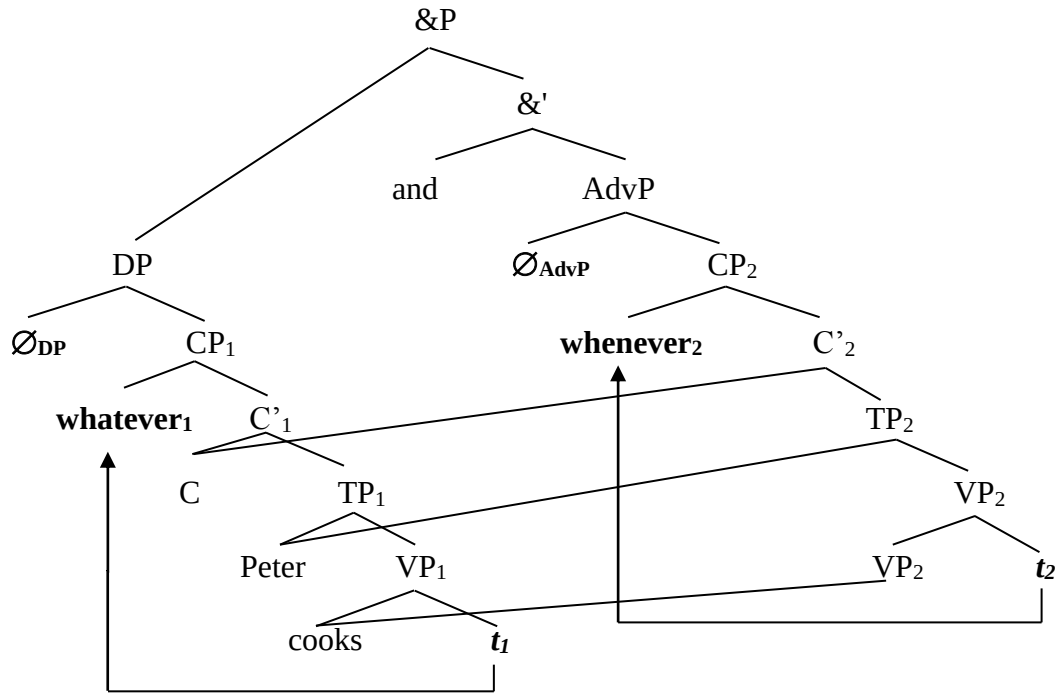
(57)



The parallelism between CWHs in English and coordinated free relatives **(CFRs)** in English, Croatian, and Polish (both MWH and non-MWH languages) suggests that grammatical CFRs are *also* derived from a bi-clausal structure in *both* types of languages. In other words, even though Croatian and Polish allow mono-clausal CWHs, they do *not* allow mono-clausal CFRs. A bi-clausal sharing structure for CFRs, parallel to the bi-clausal sharing structure for CWHs, is given in (58). In (58), each relative CP modifies a different (null) head. This is required, given that one wh-pronoun is an AdvP and the other one a DP.[31]

[31] Caponigro and Pearl (2009) treat FRs headed by wh-phrases like *when*, *where*, *how* as NP complements of a null preposition. One advantage of such an approach is that in (58), where one conjunct is a DP and the other an AdvP, it could avoid a potential violation of the Law of the Coordination of Likes (Williams 1981), assuming that *whenever* is an NP which moved stranding the null preposition behind. Alternatively, we could assume that the fact that both conjuncts are *wh* in character makes them similar enough for the purposes of coordination.

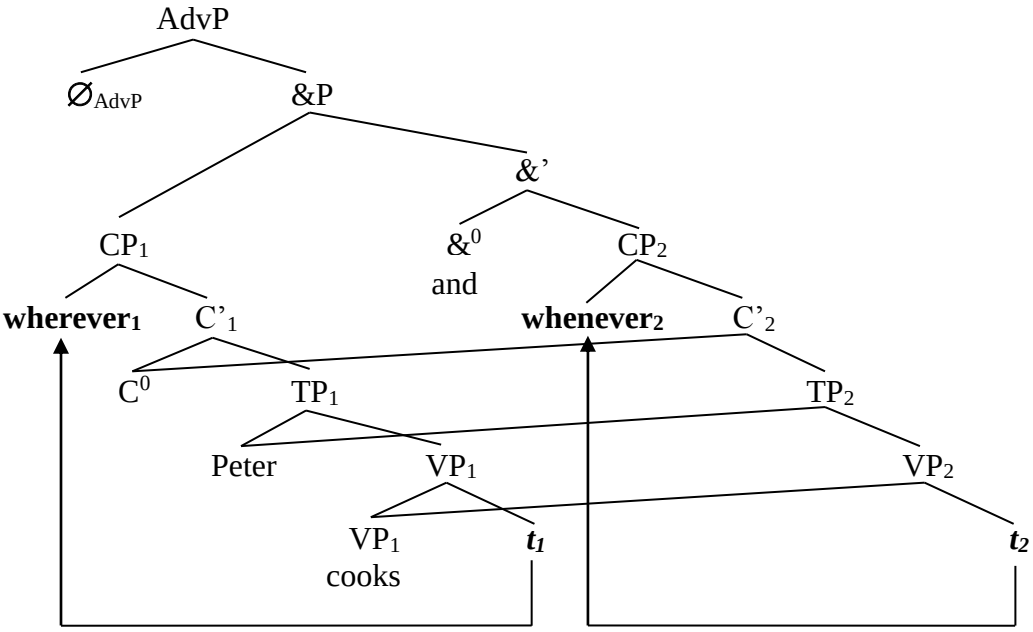
(58) John will eat...



In cases like (59a), however, in which the two wh-phrases do not differ in categorical status (both are AdvPs), the structure in (59b), in which two CPs modify a single head, could also be a possibility:

(59) a. John will eat **wherever and whenever** Peter cooks.

b. John will eat...



In the remainder of this section, we will assume the structure in (58) for concreteness. This structure trivially satisfies the Single Relative Pronoun Restriction since each null head is modified by a single FR, which contains only a single wh-phrase. Whether the representation in (59b) also satisfies the Single Relative Pronoun Restriction is somewhat less clear. The two coordinated CPs can semantically combine with the external head, and if the external head can be construed separately with each of the coordinated CPs, (59b) is parallel in spirit to the structure of a headed relative in which a single head is modified by two coordinated CPs, such as the one in (60) below, which we consider in more detail in Section 4.2. However, the problem with (59b) is that one of the wh-phrases refers to places and the other one to times, so it is hard to see how a single head could simultaneously combine with both CPs.

(60) the article **which** Mary wrote and **about which** John spoke

We thus conclude that CFRs are in principle structurally ambiguous between the representation in (58) and the one in (59b), with the caveat that when the wh-pronouns are of different types, the structure in (58) is forced.[33]

Recall from Section 2 that English CWHs are subject to the following transitivity restriction: if one of the coordinated wh-pronouns is a direct object, the verb in question cannot be an obligatorily transitive verb (like *devour, fix*, or *prepare*). This is what accounts for the contrast in grammaticality between the CWH in (61a) and the one in (62a). In more concrete terms, the reason the CWH in (61a) is well-formed is because both of its conjuncts ((61b) and (61c)) are well-formed. And the reason why (62a) is not well-formed is because one of the conjuncts (namely (62c)) is not well-formed.

(61) a. **What and where** did you eat?
b. What did you eat?
c. Where did you eat?

(62) a. ***What and where** did you devour?
b. What did you devour?
c. *Where did you devour?

Given our conclusion that CFRs in all languages investigated are derived from a bi-clausal sharing structure, we expect them to be subject to the same restriction. In particular, if only one of the two coordinated wh-phrases in a CFR is the direct object, the embedded predicate should be required to be optionally transitive. Indeed, this is the case, as shown in (63).

(63) a. John eats what(ever) and when(ever) Peter **cooks**$_{[\ \_\ (DP)]}$**.**
b. *John eats what(ever) and when(ever) Peter **prepares**$_{[\ \_\ DP]}$**.**

We propose that the reason the CFR in (63a) is grammatical is the same as the reason the coordinated wh-question in (61a) is grammatical: both of the constituent conjuncts of the CFR, indicated with square brackets, are independently grammatical, as shown in (64):

[33] This structure is also forced on the Head Account of free relatives. If the wh-phrase is the head of a free relative, then when a free relative contains two wh-phrases, it follows that it must contain two heads as well.

(64) a. John eats [**whatever** Peter cooks].
b. John eats [**whenever** Peter cooks].

By contrast, (63b) is not grammatical because one of its constituent conjuncts is not well-formed; the subcategorization requirements of the verb *prepare* are not met, as shown in (65b).

(65) a. John eats [**whatever** Peter prepares].
b. *John eats [**whenever** Peter prepares].

The contrast in (63) is thus predicted on our analysis: if one of the coordinated wh-phrases is a direct object, in order for the CFR to be well-formed, the embedded predicate cannot be obligatorily transitive. What is a bit more surprising is that the transitivity restriction in CFRs holds not only of the embedded predicate, but also of the matrix predicate, as indicated by the contrast in (66).

(66) a. John **eats**$_{[\_\ (DP)]}$ what(ever) and when(ever) Peter cooks.
b. *John **devours**$_{[\_\ DP]}$ what(ever) and when(ever) Peter cooks.

The CFR in (66b) is ill-formed even though the embedded clause contains an optionally transitive verb *cooks*, as is the case in the grammatical (66a). This indicates that the problem in (66b) arises because one of the coordinated FRs yields an ungrammatical result when combined with the obligatorily transitive verb of the matrix clause, as shown in (67).

(67) a. John devours **whatever** Peter cooks.
b. *John devours **whenever** Peter cooks.

The matrix verb *devour* requires an obligatory presence of the object, and while the object is provided by the first FR *whatever Peter cooks*, it is not provided by the second FR *whenever Peter cooks*. This constitutes additional evidence for the presence of two distinct null heads, only one of which is a DP (and thus satisfies the subcategorization requirement of the matrix verb), while the other is an AdvP (and as such cannot function as a required direct object).[34] The matrix clause seems to be construed separately with *each* of the two coordinated FRs. The ungrammaticality of (66b) thus ensues because the requirements of the matrix verb are not satisfied.[35]

If we are correct in arguing that the bi-clausal sharing structure in (58) is the correct representation for CFRs not only in English, but also in MWH languages we investigated, Polish and Croatian, we should find that CFRs in these languages are subject to the same transitivity

[34] One of the reviewers points out that categorial mismatches, which is what on our account is responsible for the ill-formedness of (67b), are not always ungrammatical, as shown by the grammatical example in (i), provided by the reviewer.
(i) *How(ever) you arrived* doesn't interest me.
We take the mitigating factor here to be the fact that the free relative is in the subject position, and refer the reader to Izvorski (1996) for an in-depth discussion of what allows non-matching subject free relatives. Note that the same free relative *however you arrived* becomes ungrammatical when it is in an object position of an obligatorily transitive verb:
(ii) *I admire *however you arrived*.

[35] It also follows from the reasoning above that a CFR is ill-formed if both matrix and embedded predicates are obligatorily transitive, as in (i).
(i) *John devours **whatever and whenever** Peter prepares.

restrictions that CFRs in English are. This is indeed what we find, as shown in (68) and (69) below.

(68) a. Jan **je**[_ (DP)] cokolwiek i kiedykolwiek Piotr **gotuje**[_ (DP)]. *Polish*
Jan eats whatever.ACC and whenever Piotr cooks
'Jan eats whatever and whenever Piotr cooks.'
b. *Jan **je**[_ (DP)] cokolwiek i kiedykolwiek Piotr mu **poleca**[_ DP].
Jan eats whatever.ACC and whenever Piotr him recommends
Lit. 'Jan eats whatever and whenever Piotr recommends to him.'
c. *Jan **ocenia**[_ DP] cokolwiek i kiedykolwiek Piotr **gotuje**[_ (DP)].
Jan evaluates whatever.ACC and whenever Piotr cooks
Lit. 'Jan evaluates whatever and whenever Piotr cooks.'
d. *Jan **używa**[_ DP] cokolwiek i kiedykolwiek Piotr mu **poleca**[_ DP].
Jan uses whatever.ACC and whenever Piotr him recommends
Lit. 'Jan uses whatever and whenever Piotr recommends to him.'

(69) a. Jan **jede**[_ (DP)] što(god) i kad(god) Vid **kuha**[_ (DP)]. *Croatian*
Jan eats what(ever).ACC and when(ever) Vid cooks
'Jan eats what(ever) and when(ever) Vid cooks.'
b. *Jan **jede**[_ (DP)] što(god) i kad(god) Vid **priprema**[_ DP].
Jan eats what(ever).ACC and when(ever) Vid prepares
Lit. 'Jan eats what(ever) and when(ever) Vid prepares.'
c. *Jan **ocjenjuje**[_ DP] što(god) i kad(god) Vid **kuha**[_ (DP)].
Jan evaluates what(ever).ACC and when(ever) Vid cooks
Lit. 'Jan evaluates what(ever) and when(ever) Vid cooks.'
d. *Jan **ocjenjuje**[_ DP] što(god) i kad(god) Vid **priprema**[_ DP].
Jan evaluates what(ever).ACC and when(ever) Vid prepares
Lit. 'Jan evaluates what(ever) and when(ever) Vid prepares.'

In particular, the examples in (68a) and (69a) are well-formed because both of the coordinated FRs are independently well-formed, as shown in (70a-b) for Polish and (71a-b) for Croatian:

(70) a. Jan **je**[_ (DP)] cokolwiek Piotr **gotuje**[_ (DP)]. *Polish*
Jan eats whatever.ACC Piotr cooks
'Jan eats whatever Piotr cooks.'
b. Jan **je**[_ (DP)] kiedykolwiek Piotr **gotuje**[_ (DP)].
Jan eats whenever Piotr cooks
'Jan eats whenever Piotr cooks.'

(71) a. Jan **jede**[_ (DP)] što(god) Vid **kuha**[_ (DP)]. *Croatian*
Jan eats what(ever).ACC Vid cooks
'Jan eats what(ever) Vid cooks.'
b. Jan **jede**[_ (DP)] kad(god) Vid **kuha**[_ (DP)].
Jan eats when(ever) Vid cooks
'Jan eats when(ever) Vid cooks.'

By contrast, (68b-d) and (69b-d) are not well-formed because one (or both) of the coordinated FRs

is not independently well-formed. This is illustrated below for (68b) and (69b), but the same reasoning applies to the remaining cases.

(72) a. Jan **je**$_{[\ \_\ (DP)]}$ cokolwiek Piotr mu **poleca**$_{[\ \_\ DP]}$. *Polish*
Jan eats whatever.ACC Piotr him recommends
'Jan eats whatever Piotr recommends to him.'
b. *Jan **je**$_{[\ \_\ (DP)]}$ kiedykolwiek Piotr mu **poleca**$_{[\ \_\ DP]}$.
Jan eats whenever Piotr him recommends
Lit. 'Jan eats whenever Piotr recommends to him.'

(73) a. Jan **jede**$_{[\ \_\ (DP)]}$ što(god) Vid **priprema**$_{[\ \_\ DP]}$. *Croatian*
Jan eats what(ever).ACC Vid prepares
'Jan eats what(ever) Vid prepares.'
b. *Jan **jede**$_{[\ \_\ (DP)]}$ kad(god) Vid **priprema**$_{[\ \_\ DP]}$.
Jan eats when(ever) Vid prepares
Lit. 'Jan eats when(ever) Vid prepares.'

This suggests that CFRs in these languages (and perhaps universally) can only involve a bi-clausal structure of the kind given in (58) or (59b) above. The mono-clausal structure is excluded due to the Single Relative Pronoun Restriction, which we derived in the previous section from independent syntactic and/or semantic considerations.

4.2. Coordinated Headed Relative Clauses

In this section we examine headed relative clauses with coordinated wh-pronouns. Our point of departure in examining multiple wh-pronouns in relative clauses was the simple assumption that relative clauses are headed. Since this is true of both headed and free relatives, we expect that whatever consequences the presence of a head has for the formation of coordinated free relatives also hold for the formation of coordinated headed relative clauses. We thus expect that coordinated headed relatives will be well-formed only if they allow for a bi-clausal representation. In other words, we predict that an ungrammatical multiple headed relative will become grammatical with the addition of a conjunction if coordination could result in an independently well-formed bi-clausal structure.

First, we predict that coordination should not improve the status of mono-clausal headed relatives. Such relatives are going to remain ungrammtical for the same reasons that corresponding free relatives were ungrammatical. And this is indeed what we find:

(74) a. *the student **whom and to whom** Mary introduced
b. *student **którego i któremu** Maria przedstawiła *Polish*
student which.ACC and which.DAT Maria introduced
Lit. 'a student whom and to whom Maria introduced'
c. *student **kojeg i kojem** Jan predstavlja *Croatian*
student which.ACC and which.DAT Jan introduces
Lit. 'a student whom and to whom Jan introduces'

A bi-clausal structure is not available for the examples in (74a-c). They all involve the verb *introduce*,

which requires both a direct and an indirect object, so a bi-clausal sharing structure (of the kind given in (58)/(59b) above), in which each wh-phrase originates in a different clause, is not an option as the verb's subcategorization requirements would not be met in either clause. The verb's requirements are only met if a mono-clausal structure is assumed, but such a relative clause is not semantically interpretable and is therefore excluded.

Let us now turn to coordinated headed relatives for which a bi-clausal structure *is* in principle available. In our discussion of coordinated free relatives in Section 4.1. above, we argued that a grammatical coordinated free relative may in principle be represented either as in (58), where each free relative modifies its own head, or as in (59b), where there is a single null head modified by a coordination of CPs. In the case of coordinated free relatives, the choice between these two representations does not affect the surface string. This is because the head of a free relative is null and does not figure in the pronunciation. With headed relatives, the head is overt. This means that on the representation in (58), the head should be overtly realized twice, contrary to fact. Therefore, in the case of coordinated headed relatives, the structure with a single overt head (parallel to the one (59b), modulo the category of the head) seems to be the only one that is available.[36] We saw above that in cases when wh-phrases in a coordinated free relative are of different categories, this structure is excluded, because a single head cannot at the same time belong to two different categories. For coordinated headed relative clauses, however, this argument does not hold because in headed relatives nothing forces the categorical identity between the head and the relative clause internal wh-pronoun.[37] So, given that nothing seems to exclude the representation in (59b) as a possible representation of coordinated headed relative clauses, and given that this representation more faithfully corresponds to the surface string (since it contains only one head), in what follows we adopt this structure as the structure for coordinated headed relative clauses.[38]

In a headed relative clause with coordinated wh-pronouns, a bi-clausal structure becomes possible if the verb in the relative clause does not require both wh-phrases to be present. This makes it possible for each wh-phrase to originate in a different clause and move to its 'own' [Spec CP], so that each relative clause is of the semantic type which can independently combine with the head noun. The schematic configuration illustrating this scenario is given in (75).

(75) $[_{DP}$ **HEAD** $[_{\&P}\ [_{CP}$ **wh**$_1$ $[_{TP}$ .... t_1...]] **and** $[_{CP}$ **wh**$_2$ $[_{TP}$ .... t_2...]]]]

If a relative clause on the surface contains coordinated wh-pronouns and a single embedded verb, as in the examples in (76), then it involves a bi-clausal sharing structure in (77), in which everything except the wh-phrases is shared between the two coordinated clauses. Note that the interpretation that the examples in (76) receive is also compatible with such a structure; they can be naturally

[36] Another option would be to assume that the coordinated relative clause indeed contains two heads, one of which is overt, while the other is null. We do not pursue this option here, but it should be considered as a logical possibility.

[37] An argument in favor of the structure in (59b) also comes from the ungrammaticality of examples like (ia-b). If (59b) is the only bi-clausal structure that a coordinated headed relative might have, we expect that such a relative will be grammatical only if the relative pronouns are compatible with a single head. In other words, we expect examples like those in (i) below to be ungrammatical, as in fact they are.

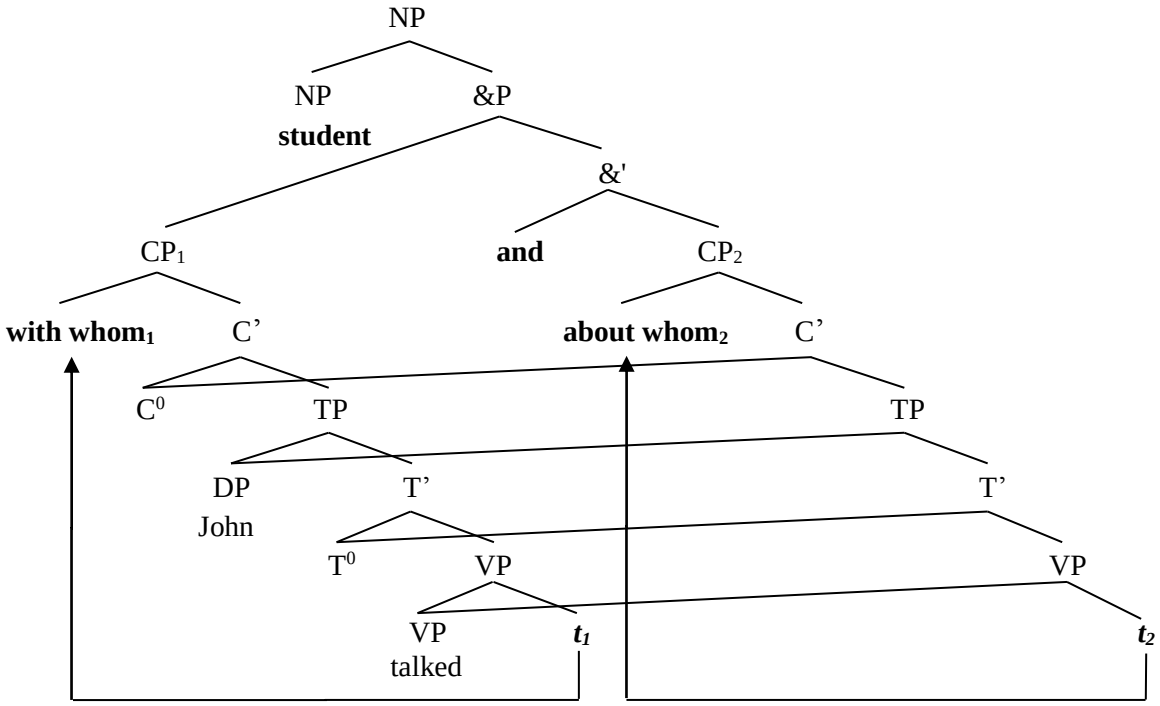
(i) a. *the city where and when John was born
b. *the year where and when John was born

[38] Note that on the head promotion analysis, the single overt head originates in each of the relative CPs. We assume that such a configuration is possible because the two CPs are coordinated, so the two CP-internal heads may undergo ATB movement out of the coordinated structure.

paraphrased as ‘the student with whom John talked and about whom John talked’, which is what a bi-clausal structure predicts.[39]

(76) a. the student **with whom and about whom** John talked
b. student **z którym i o którym** Jan rozmawiał *Polish*
student with which.INST and about which.INST Jan talked
‘a student with whom and about whom Jan talked.’
c. student **s kojim i o kojem** je Jan razgovarao *Croatian*
student with which.INST and about which.LOC AUX Jan talked
‘a student with whom and about whom Jan talked.’

(77)



[39] The grammatical examples of relative clauses with multiple relative pronouns discussed by Przepiórkowski and Patejuk (*to appear*), illustrated below, fall into this category.

(i) Tego samego pana Geigiego, **z którym i na którego balkonie** Bren spożywał teraz śniadanie.
the same Mr Geigi with whom.INST and on whose.GEN balcony Bren was.eating now breakfast
‘The same Mr Geigi with whom and on whose balcony Bren was eating breakfast now.’

(ii) To jest ten facet, **z którym i o którym** lubię rozmawiać.
this is this guy with whom.INST and about whom.INST I.like talk.INF
‘This is the guy with whom and about whom I like to talk.’ (Przepiórkowski and Patejuk *to appear*, 6-7)

Unlike the ungrammatical cases in (74) above, these grammatical examples do allow bi-clausal construals. This is confirmed by the fact that the unreduced counterpart of (76b), the one in which the structure is bi-clausal and does not involve any sharing, remains ungrammatical, as shown in (iii), while the comparable counterpart of (ii), given in (iv) remains grammatical.

(iii) *student, **którego** Maria przedstawiła **i któremu** Maria przedstawiła
student who.ACC Maria introduced and who.DAT Maria introduced
Lit. ‘a student whom Maria introduced and to whom Maria introduced.’

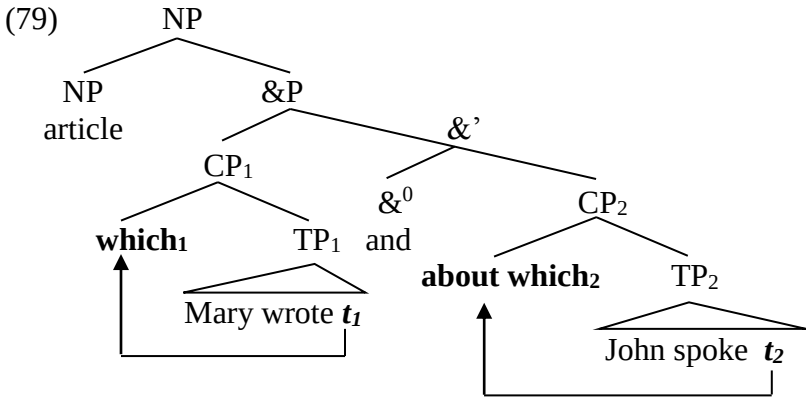
(iv) To jest ten facet, **z którym** lubię rozmawiać **i o którym** lubię rozmawiać.
this is this guy with whom.INST I.like talk.INF and about who.INST I.like talk.INF‘
‘This is the guy with whom I like to talk and about whom I like to talk.’

The two coordinated relative clauses that modify a single head, however, do not have to share any material. This is shown in (78), in which the two coordinated clauses are completely distinct from each other.[40] The result is also grammatical.

(78) a. **the article which** Mary wrote **and about which** John spoke
b. **artykuł**, **który** Maria napisała **a do którego** Jan dodał wstęp *Polish*
article which.ACC Maria wrote and to which.GEN Jan added introduction
'the article which Maria wrote and to which Jan added an introduction'
c. **članak koji** Marija piše, **a kojem** Ivan pridonosi *Croatian*
article which Marija writes and which.DAT Ivan contributes
'the article which Maria writes and to which Ivan contribues'

The structure in this case is a straightforward bi-clausal structure with no material shared between the two conjuncts, as in (79).

(79)



The data considered so far support our claim that both free and headed relative clauses with coordinated relative pronouns must involve a bi-clausal structure in which the conjunction coordinates two CPs, each containing a single wh-phrase. It is, however, possible to conceive of a bi-clausal analysis on which the conjuncts are TPs, and the structure involves a single CP layer. On such an analysis, both wh-phrases would be moving to the specifier of a single C head, where they would be coordinated with each other, as in (80).

(80) [$_{DP}$ **HEAD** [$_{CP}$ [$_{\&P}$ **wh$_1$ and wh$_2$**] [$_{C'}$ C^0 [$_{\&P}$ [$_{TP}$ .... ***t$_1$***...] and [$_{TP}$ .... ***t$_2$***...]]]]]

This is, however, not possible, as shown by the ungrammaticality of the examples in (81).

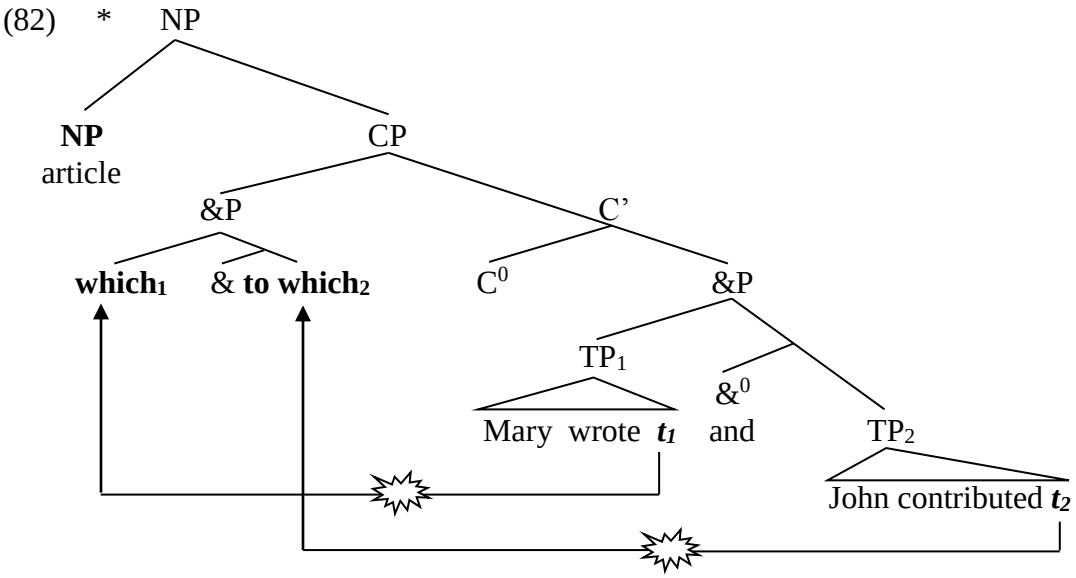
(81) a. *the article **which and to which** Mary wrote and John contributed
b. *artykuł **który** **i** **pod którym** Maria napisała a Jan się podpisał *Polish*
article which.ACC and under which.INSTR Maria wrote and Jan REFL signed

[40] A similar scenario is also available for coordinated free relatives, as shown in (i).
(i) John will eat **whatever** Mary cooks and **whenever** John arrives.

c. *članak **koji** **i** **kojem** Marija piše, a Ivan pridonosi *Croatian*
article which.ACC and which.DAT Marija writes and Ivan contributes

These examples are excluded because they involve a violation of the Coordinate Structure Constraint. Furthermore, the movement that takes place in (82) cannot be analyzed as ATB wh-movement. Even though wh-movement takes place from both conjuncts, the wh-phrases are not identical and both of them surface overtly in the specifier of CP.[41]

(82) *



We are thus led to conclude that grammatical coordinated relative clauses involve a coordination of CPs, each containing a single wh-pronoun, in compliance with the Single Relative Pronoun Restriction.

5. Conclusion

To conclude briefly, we showed that Coordinated Free Relatives (CFRs) do not show the same amount of crosslinguistic variation as Coordinated Wh-Questions (CWHs), and that, irrespective of the availability of a monoclausal structure for CWHs in a language (which in turn correlates with the availability of multiple wh-fronting), a mono-clausal structure for CFRs is not available. We derived this from a more general restriction on relativization, which bans structures in which two (or more) relative pronouns originate in the same clause. We referred to this restriction as the Single Relative Pronoun Restriction and we argued that the structures that violate it are excluded because they necessarily involve either a syntactic violation (impossible promotion of the head) or a semantic violation (semantic mismatch between the head and the relative clause). This explained why *both* free relatives and headed relatives with multiple non-coordinated wh-phrases are ill-formed. It also explained why coordinated free relative clauses, as well as coordinated headed

[41] By contrast, in ATB wh-movement cases, the two wh-phrases have to be identical (with the exception of syncretic forms) and only one surfaces overtly (see Citko 2005 and the references therein for a discussion of how these properties of ATB movement follow from a multidominant analysis).

relative clauses, although available in both MWH and non-MWH languages, necessarily have to involve a bi-clausal structure in both types of languages.

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