Direct vs. indirect disjunction of *wh*-complements, as diagnosed by subordinating complementizers **(working title)**[1]

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1. Introduction

1.1 *Direct vs. indirect disjunctions: theoretical underpinnings*

Universal quantification is a generalization of a conjunction of propositions, and existential quantification, of a disjunction of propositions. It is no wonder that many linguistic phenomena group together universals and conjunctions on the one hand, and existentials and disjunctions on the other. Starting at least with Groenendijk and Stokhof (1982, 1984), it has been noted that pair-list readings of *wh*-questions are more natural with universals than with indefinites:

(1) What is every girl doing?
Alla is laughing, and Bella is sleeping, and Celia is snacking.
(2) What are two girls doing?
?? Bella is sleeping and Celia is snacking.

Szabolcsi (1997) and Krifka (2001) argued that a parallel contrast can be observed between plain conjunctions and disjunctions of *wh*-questions. Restricting attention to main clauses for the moment, the connective *and* is equally good in inter-sentential (3a) and intra-sentential (3b) positions. But the connective *or* is much better in the inter-sentential version, and indeed (4a) may be seen as replacing the first question with the second. (4b) is less natural.

(3) a. Where do you live? And, who did you marry?
b. Where do you live and who did you marry?
(4) a. Where do you live? Or (rather), who did you marry?
b.?? Where do you live or who did you marry?

Different explanations have been proposed for why such contrasts exist. At the heart of the explanation Groenendijk and Stokhof offered is the claim that the semantic duty of a question is to partition the set of possible worlds:

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[1] This paper is dedicated to the memory of Javier Gutiérrez Rexach, a good friend, an excellent and versatile semanticist, and the author of the inspiring article *Questions and Generalized Quantifiers* (1997). I thank Lucas Champollion, WooJin Chung Ivano Ciardelli, Jeroen Groenendijk, and Floris Roelofsen for discussions at earlier stages of the research presented here.

to carve it into mutually exclusive and jointly exhaustive subsets. This requires questions to have unique true and complete answers: each cell of the partition contains those worlds in which one such answer holds. Giving a particular answer locates the actual world in a particular cell. An atomic question (*What is Alla doing?*, *Where do you live?*) has a unique true and complete answer, and the conjunction of questions does too. But the disjunction of questions offers a choice. In (2), the addressee may choose to answer about Bella and Celia (as illustrated), or about Alla and Bella, or about Alla and Celia. Likewise, the intended interpretation of (4b) is that the addressee may choose to answer either the *where*-question or the *who*-question. Taking (2) and (4) at face value, the partition theory does not qualify them as semantic questions.

Whether we are happy with this result depends on how we evaluate the ?? tags on (2) and (4). Jumping ahead in time, Krifka (2001) argued that speech acts in general, question acts among them, cannot be disjoined.

> We conclude that, while coordination [i.e. conjunction, AS] is a well-defined operation for speech acts, disjunction is not. Syntactic forms that look like disjunction of two speech acts typically are interpreted in special ways, for example, by lowering the disjunction to the propositional level or by interpreting it as a replacement of the first speech act.
>
> Why are there no natural cases of speech act disjunctions? If we see speech acts as operations that, when applied to a commitment state, deliver the commitments that characterize the resulting state, then we can give the following answer: speech act disjunction would lead to disjunctive sets of commitments, which are difficult to keep track of. Take commands as an example. Uttering a conjoined command [A & A'](s) leads, in general, to the union of the commitments that A(s) and A'(s) would have led to: A(s) ∪ A(s'). But a disjunction of A and A' at the state s could only be captured by a set of commitment states which we would have to under stand disjunctively, {A(s), A(s')}. This is of a higher type than a simple commitment state, and further disjunctive speech acts would lead to still higher types. Hence, we cannot have speech act disjunction and a uniform type of commitment states, namely sets of commitments, at the same time. (Krifka 2001:16)

Because Krifka is concerned with speech acts in semantic, not in pragmatic, terms, his response is fully relevant to us. However, its scope is limited to main clauses and, perhaps, certain special complements. (5) and (6) contain *wh*-complements but no speech acts (no question acts):

(5) a. Sue knows what every girl is doing.
    b. Sue knows what two girls are doing.
(6) a. Sue knows where you live and who you married.
    b. Sue knows where you live or who you married.

The contrasts noted in main clauses disappear in *know*-complements.

(5) and (6) are important, because the other authors were concerned with both main-clausal and complement uses of *wh*-interrogatives.

Groenendijk and Stokhof (1984) (henceforth G&S) proposed that quantification and coordination can operate on interrogatives that are first lifted to generalized quantifiers.

(7) *Lifting* of interrogative *Q*: $\lambda P[P(Q)]$
where *P* is a property like *is known by Sue*, *is a secret*, etc.

(8) *Indirect* conjunction/disjunction:
$\lambda P[P(Q_1)] \cap/\cup \lambda P[P(Q_2)] = \lambda P[P(Q_1) \cap/\cup P(Q_2)]$

(9) *Direct* conjunction/disjunction:
$Q_1 \cap/\cup Q_2$

When the participating interrogatives are first lifted, their coordination is *indirect*: it pertains to sentences or verb phrases that contain interrogatives, but not to interrogatives themselves. We illustrate this with a skeletal version of (6b):

(10) a. Sue knows where you live or who you married.
b. $\lambda P[P(\text{where...}) \vee P(\text{who...})]$
c. $\lambda q[\text{Sue\_knows}(q)]$
d. $\lambda P[P(\text{where...}) \vee P(\text{who..})](\lambda q[\text{Sue\_knows}(q)]) =$
$= \text{Sue\_knows}(\text{where...}) \vee \text{Sue\_knows}(\text{who...})$

By invoking indirect disjunction, G&S have their cake and eat it too. *Wh*-interrogatives joined with *or* do not need to run counter to the partition theory of the semantics of questions. They maintain that main-clause questions as well as *wh*-complements can be lifted. According to them, the ??-marked examples (2) and (4) may be more labored than (1) and (3), but they are essentially acceptable.

Szabolcsi (1997) adopted the partition theory, but disagreed with G&S as to the use of lifting. She argued that, unless we literally adopt Ross's performative hypothesis, it is unnatural to interpret main clauses as generalized quantifiers in the manner of (10): main clauses will never combine with the expressions *P* that generalized quantifiers are functions of. The natural habitat of lifted questions is the complement position. According to Szabolcsi, the ??-marked main-clausal (2) and (4) either have alternative, non-literal interpretations or are unacceptable. (This is the same conclusion that Krifka subsequently reached with reference to speech acts.) On the other hand, Szabolcsi subscribed to the use of lifting in the treatment of *wh*-complements.

The present paper will not study main-clause questions any further; our

focus is on *wh*-complements. What is the state of the art in that domain?

A major development has been the discovery that some but not all *wh*-complements have strongly exhaustive readings (ones that correspond to unique true and complete answers for main-clausal questions). Moreover, the weaker readings cannot be obtained from the strongly exhaustive ones, but one can proceed the other way around. See Heim (1994), Beck and Rullmann (1999), Klinedinst and Rothschild (2011), Spector and Egré (2015), Theiler (2014), and Cremers and Chemla (2016), among others.

For example, Cremers and Chemla elicited judgments for (11) in a situation in which out of four squares, two blue and two red, John correctly remembered the two blue ones as blue, but thought that one of the red squares was green and had no recollection of the color of the other red square.

(11) John knew which squares were blue.

A significant number of speakers judged (11) to be false, apparently assigning it a strongly exhaustive reading (John did not know about each of the squares whether it was blue or not). But a significant number of other speakers accepted (11) as true, which indicates that weaker readings are also available. The non-negotiable requirement is for John to have no false beliefs regarding the facts that the question is explicitly concerned with.

Consequently, the partition theory, which does not recognize weaker readings, has been abandoned. For example, Inquisitive Semantics has developed a non-partitional semantics for questions, for reasons going beyond those discussed above. As a by-product, the disjunction of questions is predicted to be unproblematic, as far as the basic semantics is concerned. See Mascarenhas (2009), Groenendijk and Roelofsen (2009), and Ciardelli, Groenendijk and Roelofsen (2015), and many other works.

1.2 *Agenda: What do complementizers tell us about direct vs. indirect disjunction?*

Although the pressing theoretical need for indirect disjunction, cf. (8) seems to have disappeared, the factual question has not. Are *wh*-complements disjoined directly or indirectly? What is the fact of the matter?

Szabolcsi (1997: 324-327) briefly introduced the observation that the presence of a subordinating complementizer in each coordinated clause correlates with indirect coordination, i.e. with the conjunction/disjunction of lifted complements. Languages that have subordinators in *wh*-complements as well allow one to study the distribution of direct vs. indirect disjunctions in a way that English does not. Among others, Hungarian and Korean are such languages.

(12) Complementizer *hogy* is required in each disjunct:
János megtudta, hogy kit vettél feleségül
John found.out SUB whom took.2sg as.wife
*vagy *(hogy) hol laksz.*
or SUB where live.2SG
`John found out who you married or where you live'

(13) Complementizer *hogy* is optional in the second conjunct:
János megtudta, hogy kit vettél feleségül
John found.out SUB whom took.2sg as.wife
és (hogy) hol laksz.
and SUB where live.2SG
`John found out who you married and where you live'

The present paper investigates *wh*-complements primarily in Hungarian, with convergent Korean data kindly supplied by WooJin Chung. English *that*-complement examples will be invoked to help the reader develop basic intuitions, without attempting to make systematic claims about English. I focus on the following issues:

(14) How and why does the presence of a complementizer in each clause correlate with lifting and thus indirect coordination?

Section 2 gives a sense of how a single complementizer vs. one in each coordinated clause correlate with direct vs. indirect coordination, and offers two semantic accounts of subordinating complementizers. One is that the subordinator is a type-lifter; the other that it is a bridge between the clause and an abstract individual à la Moulton (2015). It also discussess the possibility of free lifting.

(15) What is the distribution of direct vs. indirect disjunctions? Is there a difference between veridical vs. non-veridical matrix contexts?

(16) Do there remain cases of direct disjunction after all? If yes, can they perhaps be explained away as conjunctions (exemplifications)?

Section 3 starts with the observation that embedded under `find out' (i.e. in veridical contexts), Hungarian and Korean *wh*-disjunctions require the presence of a subordinator in each disjunct. This fact is taken to indicate that such disjunctions must be indirect. It then addresses Haida and Repp's (2013) argument that non-veridical (e.g. negated) matrix clauses allow for direct *wh*-disjunctions, and argues that those cases plausibly involve intermediate-scope indirect disjunctions. Finally, it brings in a veridical case,

from Ciardelli et al. (2015), that seems like a defiant holdout against the "no direct disjunction of *wh*-complements" claim.

Section 4 introduces exemplifications: coordinations involving `or' that specialize in giving non-exhaustive list. It proposes that these are in fact `as well as' style conjunctions, and raises the possibility that the holdout case in Section 3 falls under this rubric.

Section 5 discusses naturally occurring data and elicited judgments for Hungarian *wh*-disjunctions, and section 6 introduces parallel examples from Korean by WooJin Chung, that square with the Hungarian generalizations.

Section 7 concludes with a question. If there is reasonably robust evidence that many contexts in Hungarian and Korean require indirect *wh*-disjunctions, what theory of interrogatives predicts that, now that the partition semantics cannot be pressed into service?

2. A single complementizer vs. one in each conjunct/disjunct

2.1 *The subordinating complementizer as a type-lifter*

Hungarian has an invariant subordinating complementizer (*hogy* /hodj/) in all complement-clause types. It will be glossed as SUB.

(17)	*Tudom,*	*hogy*	*Kati*	*otthon*	*van*.
	know.1SG	SUB	Kate	home	is
	`I know that Kate is at home'				
(18)	*Tudom,*	*hogy*	*Kati*	*otthon*	*van-e*.
	know.1SG	SUB	Kate	home	is-INTERROG
	`I know whether Kate is at home'				
(19)	*Tudom,*	*hogy*	*Kati*	*hol*	*van*.
	know.1SG	SUB	Kate	where	is
	`I know where Kate is'				
(20)	*Követelem,*	*hogy*	*Kati*	*otthon*	*legyen*.
	demand.1SG	SUB	Kate	home	be.SUBJ.3SG
	`I demand that Kate be at home'				

Invariant *hogy* makes it easy to examine the same coordination patterns across all clause types. English lacks an overt complementizer in *wh*-clauses, so the basic intuition will be introduced using *that*-clauses.

Consider the following pairs. There is a subtle but systematic contrast between single-*that* and double-*that* examples:

(21) *Sue was surprised <u>that</u> John was drunk and Mary was driving.*
can mean: `surprised by the combination'

(22) *Sue was surprised that John was drunk and that Mary was driving*.
preferred: `surprised by this and surprised by that'

(23) *Sue was surprised that John drinks or Mary gambles*.
can mean: `surprised by the disjunction'

(24) *Sue was surprised that John drinks or that Mary gambles*.
preferred: `surprised by this or surprised by that, I am not sure which'

In first-personal attitude reports, double-*that* results in infelicity, because it forces a reading where the speaker is not sure what he/she knows (believes, regrets, etc.):

(25) *I know that John drinks or Mary gambles*.
felicitous: `I know the disjunction'

(26) *I know that John drinks or that Mary gambles*.
less felicitous: `I know this or I know that, I am not sure which I know'

What explains the contrasts? Szabolcsi (2015b) proposed the simple idea that the subordinator is a type-lifter: it signals that its clause is slated to be the argument of an embedding verb. I.e. *that John drank* is a function from embedding verbs to VPs. Now, if the subordinator is present in both clauses, they are first lifted individually and then get conjoined/disjoined. The interpretation is (a), which guarantees that the embedding verb distributes into both conjuncts/disjuncts, as in (b):

(27) a. *that A and/or that B* = $\lambda P[P(A)] \cap/\cup \lambda P[P(B)] =$
$= \lambda P[P(A) \cap/\cup P(B)]$
b. $\lambda P[P(A) \cap/\cup P(B)](verb) = verb(A) \cap/\cup verb(B)$

If only one subordinator is present, then it is at least possible for *A* and *B* to be directly conjoined/disjoined and, therefore, for the verb not to be distributed into the individual conjuncts/disjuncts:

(28) a. *that A and/or B* = $\lambda P[P(A \cap/\cup B)]$
b. $\lambda P[P(A \cap/\cup B)](verb) = verb(A \cap/\cup B)$

Why is it only possible, not necessary? Even if the subordinator is a lifter, lifting might also apply freely (as it is customarily assumed). If so, then the single-*that* examples are predicted to be ambiguous. It is plausible that there is an additional economy constraint that prefers as little lifting as is compatible with the overt material. (But see also *2.3*.)

(29) Free lifting (possible but dispreferred in view of the overtly marked double-that option in (27)):
that A and/or B = $\lambda P[P(A)] \cap/\cup \lambda P[P(B)]$ =
= $\lambda P[P(A) \cap/\cup P(B)]$

This seems like a correct first approximation of the judgments. It is definitely a correct approximation of the Hungarian data.

2.2 *The complementizer as a "bridge"*

What if *that* is, in fact, not a type-lifter, i.e. if *that John was drunk* cannot be regarded as a function that takes a propositional attitude verb as an argument? Moulton (2015), following Kratzer (2006), argues that the attitude verb does not select for a proposition. Instead, it selects for an abstract individual (notated as x_c) whose content is given by the complement clause, in the manner of Predicate Modification:

(30) a. $CONT(x_c)(w) = \{w' : w'$ is compatible with the intentional content determined by x_c in $w\}$
b. $[[C]] = \lambda p\ \lambda x_c\ \lambda w\ [CONT(x_c)(w) = p]$
c. [[that Fred left]] = $\lambda x_c\ \lambda w\ [CONT(x_c)(w) =$
= $\lambda w'$[Fred left in w']]

(31) $\lambda x_c\ \lambda w\ [$John explained$(x_c)(e)(w)] \cap$
$\lambda x_c\ \lambda w\ [CONT(x_c)(w) =$ that Fred left]
= $\lambda x_c\ \lambda w\ [$John explained$(x_c)(e)(w) \wedge CONT(x_c)(w) =$ that Fred left]

(32) $\exists$-closure and event-abstraction:
$\lambda e\ \lambda w\ \exists x_c\ [$John explained$(x_c)(e)(w) \wedge CONT(x_c)(w) =$ that Fred left]

Over and above general considerations, such an analysis would make sense for Hungarian. Recall that all complement clauses are introduced by *hogy*. The *hogy*-clause combines with the verb directly, or it first attaches to the distal demonstrative "head" *az*. It suffices to recast just one example from the beginning of this section, because they all work identically. For consistency, I continue to gloss *hogy* as SUB.

(33) a. *(az,)* *hogy* *Kati* *otthon* *van*
DEM SUB Kate home is
`that Kate is at home'
b. *(az) a tény, hogy Kati otthon van*
DEM the fact SUB Kate home is
`the fact that Kate is at home'

Let us assume that the *hogy*-clause always attaches to DEM, but DEM may

be phonetically null. (See de Cuba and Ürögdi (2009) for details.) It is plausible that *(az,) hogy Kati otthon van* is a generalized quantifier over content individuals x_c, and *hogy* is a "bridge", as per Moulton, between such an individual and the complement content.

(34) $\lambda P \lambda e \exists x_c$ [$P(x_c)(e)(w) \wedge CONT(x_c)(w)$ = that Kate is at home]

The same *hogy*-construction in Hungarian specifies quotational content, something that English expresses with apposition:

(35) *az (a szó,) hogy "nem"*
DEM the word SUB *nem*
`the word *nem'* [expresses negation]

(36) *az (a mondat,) hogy "Nem megyek haza"*
DEM the sentence SUB *Nem megyek haza*
`the sentence *Nem megyek haza'* [occurred twice]

Note that none of these constructions involves a relative clause. Relative clauses also have demonstrative "heads", but they are introduced by relative pronouns (e.g. *amelyik* `which') and not by *hogy*. Those are not interchangeable; the strings in (37) are word salads.

(37) a. * *az (a tény), amelyik Kati otthon van*
*`the fact which Kate is at home'

b. * *az (a kérdés), amelyik Kati hol van*
*`the question which where Kate is'

c. * *az (a szó,) amelyik <u>nem</u>*
*`the word which *nem*'

How does such a rethinking of the role of *hogy* affect the coordination situation? The content of one x_c cannot be identical to two distinct propositions. If we have two propositions, one possibility is to conjoin/disjoin them before the result specifies the content of x_c with the help of one *hogy*:

(38) $\lambda P \lambda e \exists x_c$ [$P(x_c)(e)(w) \wedge CONT(x_c)(w)$ = that Kate is at home and/or Mary is at home]

Alternatively, two distinct quantifiers can be formed with the two propositions and they are subsequently conjoined/disjoined. Once (39) combines with the matrix verb, the result is no different from (27).

(39) $\lambda P \lambda e \exists x_c$ [$P(x_c)(e)(w) \wedge CONT(x_c)(w)$ = that K ...] $\cap/\cup$
$\lambda P \lambda e' \exists y_c$ [$P(y_c)(e')(w) \wedge CONT(y_c)(w)$ = that M ...] =
λP[$\lambda e \exists x_c$ [$P(x_c)(e)(w) \wedge CONT(x_c)(w)$ = that K ...] $\cap/\cup$

$\lambda e' \exists y_c\ [P(y_c)(e')(w) \wedge CONT(y_c)(w) = \text{that M ...}]]$

(*$P(y_c)(e)(w)$* should really be <e,t> ; we intend to lift over the matrix verb.)

If this is correct, the results of the lifting account of the single-*hogy* vs. double-*hogy* contrast can be replicated.

2.3 *A caveat re:* az*, the demonstrative "head"*

Further work will be needed to fully figure in the contribution of *az*. Whether *az* can be present at all is contingent on the embedding verb and on topic-focus relations. In principle there are five possibilities, of which the work I am reporting in this paper has scrutinized the contrast between (d) and (e).

(40)
a. az, hogy S_1 és/vagy az, hogy S_2
DEM SUB S_1 and/or DEM SUB S_2
b. az, hogy S_1 és/vagy hogy S_2
c. az, hogy S_1 és/vagy S_2
d. hogy S_1 és/vagy hogy S_2
e. hogy S_1 és/vagy S_2

Scrutinizing the contrast especially between (a) and (b) might help fine-tune the analyses. Recall from *2.1* that English single-*that* sentences were tentatively claimed to be ambiguous between a direct and an indirect coordination reading. The more careful survey of Hungarian data has yielded the same result for single-*hogy* wh-complements. At the end of 2.1, I proposed that this ambiguity is due to the fact that lifting can freely apply to the second member of the coordination. Whether lifting is indeed a free operation (as generally assumed in the semantic literature) or such sentences can contain phonetically null elements (*$that_{\varnothing}$*, *$hogy_{\varnothing}$*, *$az_{\varnothing}$*, perhaps even *$it_{\varnothing}$*) that correspond to the operations that result in indirect coordination is an interesting question. However, I have not done either the descriptive or the theoretical work needed to address it. It is entirely left to future research.

2.4 *Interim summary*

This section addressed how and why the presence of iterated complementizers correlates with indirect coordination involving lifting. It was proposed that the subordinating complementizer can be interpreted either as a type-lifter or as a "bridge" in the spirit of Moulton (2015). In either case, two complementizers will correspond to two clausal generalized quantifiers, and the embedding verb will be distributed over the members of the coordination. Thus, *Sue was surprised that John was drunk and that Mary was driving* will be interpreted as Sue experiencing two surprises, as desired. Examples with a single complementizer will be able to carry the direct coordi-

nation (single surprise) reading. If such examples are in fact ambiguous, the type-lifter analysis easily allows for separate liftings to occur even in the absence of a second overt complementizer, subject to some economy condition.

For simplicity, the rest of the paper will talk about indirect coordination in terms of lifting, but the availability of the alternative analysis in terms of Moulton (2015) will always be assumed.

3. Veridical vs. non-veridical contexts

3.1 *Veridical contexts in Szabolcsi (1997)*

An observation in Szabolcsi (1997), central to present concerns, was that in Hungarian (and in Korean), *wh*-complement disjunctions require the presence of *hogy* in each disjunct, but *wh*-complement conjunctions do not. The examples involved the matrix verb *megtud* `find out'. Repeated here:

(41) *Hogy* is required in each disjunct:
János megtudta, hogy kit vettél feleségül
John found.out SUB whom took.2sg as.wife
*vagy *(hogy) hol laksz.*
or SUB where live.2SG
`John found out who you married or where you live'

(42) *Hogy* is optional in the second conjunct:
János megtudta, hogy kit vettél feleségül
John found.out SUB whom took.2sg as.wife
és (hogy) hol laksz.
and SUB where live.2SG
`John found out who you married and where you live'

In the spirit of the discussion above, Szabolcsi interpreted the contrast as confirming that interrogatives must be first lifted in order to become disjoinable -- but not in order to become conjoinable. We will look at further examples in Hungarian and Korean in sections 4, 5 and 6.

3.2 *Non-veridical contexts in Haida and Repp (2013)*

Haida and Repp (2013) argue that the disjunction of *wh*-complements is unacceptable in a veridical environment, but acceptable in a decreasing or non-veridical one. The first part of their claim is in agreement with Szabolcsi's, but the second part is not. Acknowledging that Haida and Repp (H&R) are correct in observing a veridical--non-veridical contrast, I will offer some thoughts about their analysis and propose an alternative.

On H&R's view, *wh*-question disjunctions denote proper semantic questions, but are pragmatically deviant outside specific contexts. These specific contexts are contexts that license polarity-sensitive items (PSIs): decreasing or non-veridical ones. In PSI-licensing contexts, the pragmatic inadequacy disappears due to a pragmatically induced recalibration of the implicature triggered by *or* (cf. Chierchia 2004). In detail,

[29] The police did [not [find out [$_{orP}$ [$_{Q1}$ how Paul got home that night] [$_{or'}$ or [$_{Q2}$ when Paul got home that night]]]]]

The unenriched meaning of [29] that occurs in a non-veridical context is given in [30].

[30] ¬find_out (the_police, ans({p1 ∨ p2 | p1 ∈ [[Q1]]g ∧ p2 ∈ [[Q2]]g }))

[31] ans(Q) = λw.∀p(p ∈ Q → p(w))

If we assume, as before, that Paul in fact got home only by bus and only at 3 a.m., [30] is the semantic object in [32], where ANS is the proposition in [33].

[32] ¬find_out(the_police, ANS)

[33] ANS = λw(Paul got home by bus in w ∨ Paul got home at 3 a.m. in w)

In contrast, a locally enriched meaning that occurs in a veridical context:

[14] * The police found out how or when Paul got home that night.

[45] find_out(the_police, O_{ALT} (ans({p1 ∨ p2 | p1 ∈ $[[Q1]]^g$ ∧ p2 ∈ $[[Q2]]^g$ })))

p_{bus} and p_{3am} are true in the actual world: they are elements of $[[Q1]]^g$ and $[[Q2]]^g$, respectively, which are sets of true answers. This means that the enriched embedded proposition, i.e. (p_{bus} ∨ p_{3am}) ∧ ¬(p_{bus} ∧ p_{3am}), is false in the actual world. This produces a presupposition failure under the factive verb *find out*, and more generally, a failure of the existence presupposition of the embedded wh-question. That is we assume that a wh-question Q presupposes that there is a true answer, which is not satisfied by the pragmatically enriched answer to Q. This also explains why wh-disjunctions neither can be embedded under non-factive verbs like *tell* (not illustrated). (Haida and Repp 2013: XX)

I do not find the argument that these examples represent direct disjunctions compelling. Within the immediate scope of decreasing operators (DE) it is

impossible to distinguish the following two constellations:

(43) DE > verb(Q_1 or Q_2)
(44) DE > verb(Q_1) or verb(Q_2)

Compare:

(45) a. The police didn't find out (how he got home or when he got home).
b. The police didn't (find out how he got home or find out when he got home).

Szabolcsi's (1997) claim was that what look like disjunctions of *wh*-complements are in fact results of lifting, so that they are disjunctions of VPs. Contexts in which the truth conditions of the two structures are indistinguishable are not suitable for arguing against that position .

Indeed, I believe that the reason why the DE environments discovered by H&R work so well with sentences of the shape of their [38a] lies in their equivalence to their [38b]; that is, I believe that they are in fact cases of lifting *within* the scope of the DE operator.

In some non-decreasing, non-veridical cases, too (not from H&R) the "lift within the scope of an operator" account seems very satisfactory. It involves some lexical decomposition:

(46) Mary is investigating where John lives or what he does for a living.
`Mary is trying (to find out where John lives or to find out what he does for a living)'

In other words, the lifting analysis doesn't make it necessary to interpret this sentence as "Mary is investigating this or investigating that". In fact, as J. Groenendijk (p.c.) points out, that interpretation would not arise in the original 1984 framework either. In G&S's terms, *investigate*, like *wonder*, is an intensional question-embedding verb. Therefore the basic (non-extensionalized) interpretation is as below, which does not entail that Mary investigates this question or Mary investigates that question:

(47) a. Mary is investigating (where John lives or what he does for a living).
b. investigate′ (λi[λj[λx[John lives at x in i] = λx[John lives at x in j] ∪ λj[λx[John does x in i] = λx[John does x in j]]])

So G&S would not need to decompose *investigate* into *try to find out*. I point out the possibility of decomposition, because this assimilates the case

at hand to the others under consideration.

H&R's own non-decreasing, non-veridical examples would serve as more compelling arguments for direct disjunction. I would add that, given the subtlety of the judgments, we don't only need examples where the readings are in principle distinguishable; we need ones that speakers easily and confidently distinguish. It seems to me an overstatement that "speakers quite readily decide that the investigator should get the money" in the H&R's [37] scenario:

> Next consider imperatives as embedding contexts. Imperatives license free choice items and not negative polarity items like negation and conditionals.
>
> [37] *Suspicious wife to private investigator:* Find out how or when my husband returned to his hotel last night! I'll give you $1000 if you succeed.
>
> A week after, the private investigator tells the wife that her husband returned to his hotel by bus or at 3 a.m. Should he get the money?
>
> If confronted with this context and asked the final question speakers quite readily decide that the investigator should get the money even though the information he provides might not be what the wife had in mind – she might have wanted to hear the answer to either of her questions, e.g. that her husband indeed returned to his hotel by bus. We conclude that the imperative in [37] in addition to the choice reading also has a true question disjunction reading. (Haida and Repp 2013: XX)

These judgment bears a very heavy burden in H&R's theory, because the claim seems to be that on one reading of their [37] the suspicious wife unwittingly asks the investigator to return with a disjunction.

Whether or not the judgment concerning H&R's [37] is easy, note that [37] would be amenable to the "lift within the scope of an operator" approach I am advocating. The imperative undoubtedly involves an operator above the verb:

> (48) Find out (how my husband returned or when my husband returned).
> bring-it-about that you (find out how my husband returned or find out when my husband returned)

In sum, it seems the non-veridical examples can be generally accounted for on the lifting proposal. If so, then we are back to the veridical case for potential source of evidence for direct disjunction.

3.3 *A new veridical test case in Ciardelli et al. (2015)*

Ciardelli et al. (2015: 80-84) offer a new data point in favor of the Inquisitive Semantics claim that *wh*-questions and *wh*-complements can be directly disjoined without a problem. They observe that (49) is felicitous as a single question.

(49) Where can we rent a car, or who might have one that we could borrow?

They add that the Hungarian *wh*-complement version of (49) also work with a single *hogy* (data and judgments credited to D. Farkas, A. Lipták and A. Szabolcsi). The judgments are the same with *azt vizsgálja* `is investigating' in the place of *megtudta* `found out'.

(50) *Péter megtudta, hogy hol tudunk autót bérelni,*
Peter found.out SUB where can.2PL car.acc rent
vagy (hogy) kinek van egy, amit kölcsönvehetnénk.
or SUB who has one which.acc could.borrow.1PL
`Peter found out where we can rent a car or who has one that we could borrow'

They propose that the reason why direct disjunctions of main-clause questions and *wh*-complements often sound unacceptable or incoherent is pragmatic. They comment:

> The disjunction of two questions expresses an issue that may be resolved equally well by providing information resolving the first disjunct, or by providing information resolving the second disjunct. It is difficult to see what kind of motivation (or what kind of decision problem, to follow van Rooij (2003)) a speaker could have that would lead her to raise or even consider the issue expressed by [*Where do you live or who did you marry?*]. This is very different in the case of [*Where can we rent a car, or who might have one that we could borrow?*]: in this case, it is immediate to reconstruct the sort of motivation that may lead a speaker to consider the relevant issue. We suggest that the different cognitive naturalness of the two issues at stake underlies the difference in the perceived felicity of the associated questions. (Ciardelli et al. 2015: 83-84)

I agree with the judgments and with the insight that the existence of an easily recognizable issue to which both questions pertain is an important factor in acceptability of these examples. But I doubt that interrogatives that do not relate to the resolution of an easily recognizable issue automatically sound unacceptable to the point of ungrammaticality. I also doubt that all

wh-disjunctions become acceptable once a pragmatically felicitous context is found. Thus, the reasoning does not explain why Hungarian and Korean so strongly prefer wide scope `or' readings and, consequently, subordinators in each disjunct, in most veridical contexts.

I raise the possibility that examples such as (49)-(50) represent a special kind of conjunctions that I will call exemplifications. That is to say, (50) intends that Peter found various ways to get hold of a car: where to rent, from whom to borrow, and maybe others. It does not mean that he found at least one way; even less, that he found one and just one way (which would be the exhaustified interpretation of the disjunction, in the spirit of much recent work). Exemplifications are introduced in the next section.

4. Exemplificatory `or'

The distinction between *and* and *or* may appear to be among the simplest ones, but surprisingly, it is not. In exemplifications, the word *or* could easily be replaced by *and* although, I will argue, the replacement would often give the feeling of an exhaustive list, instead of an incomplete, open one.

The reader will note that some of the examples below, and some of the examples he or she may recall having seen or even produced, contain possibility modals or other plural existentials. If all exemplifications were such, it would be relatively straightforward to subsume them under the rubric of free choice (Zimmermann 2000, Menéndez-Benito 2005, Klinedinst 2007, Fox 2007, Zimmermann 2008, and others):

(51) a. He may be in London or in Paris =
He may be in London and he may be in Paris
b. Some passengers became nauseous or had trouble breathing =
Some passengers became nauseous and some passengers had trouble breathing.
c. You may take any of the cards from the discard pile.

But not all exemplifications conform to the free choice patterns. First, many of them do not involve eother explicit or implicit modals. Second, as was mentioned above and as the nickname indicates, their most striking characteristic is that they offer open, incomplete lists. Non-exhaustivity is not a robust characteristic of free choice.

Below are are naturally-occurring examples from English and Hungarian. Although it is quite clear that "exemplification *or*" also occurs without flags like *among other things* or *for example*, including such flags in Google searches ensures that we know what the writer of the text actually had in mind. I start with a few English examples: (select a smaller sample)

(52) Such cells are, for example, cells like mucosal cells or intestinal cells.
Patent US9243293 - Genes associated with posttraumatic-stress ...
www.google.com/patents/US9243293

Such sectors are, for example, information technology, consumer staples, telecommunications, or utilities, each of which behaves differently.
Portfolio construction via bottom-up - UBS guest speaker - University ...
https://www.coursera.org/.../portfolio-construction-via-bottom-u..

Such sites are, for example, sports associations or music clubs, communal gardens or community centres.
Download www.mmg.mpg....

These changes have, among other things, moved or closed polling places, shortened or canceled early-voting periods, required proof of citizenship or a photo identification to register to vote, erroneously purged voters from the rolls and gerrymandered districts to dilute the power of minority voters.
https://wikileaks.org/dnc-emails/emailid/10641

In what ways are the reputations of such major figures as Auden, MacNeice, Isherwood or Orwell enhanced or compromised by their continued associations with the period?
https://www.jiscmail.ac.uk/cgi-bin/webadmin?A2=lit-lang-culture-events;58566561.1605

These risks and uncertainties include, among other things, shortages, cost increases or delays in receipt of supplies, materials or labor; inability to obtain, delays in the receipt of, or other issues associated with necessary licenses, permits, approvals, consents, rights of way or other governmental or third party requirements...
http://ir.paalp.com/profiles/investor/ResLibraryView.asp?ResLibraryID=77697&GoTopage=1&Category=117&BzID=789&G=549

The label must state, for example, the nature of a nutritional or compositional change, or the presence of an allergen.
http://www.tpsgc-pwgsc.gc.ca/ongc-cgsb/programme-program/normes-standards/internet/032-0315/index-eng.html

When you provide personal data to ConRes, the potential uses include, among others, providing requested information or educational materials, providing ConRes services via online access, or training or educational activities.
https://www.conres.com/conres-your-source-for-high-technology-solutions/continental-resources-privacy-policy/

Knowledge of the existing mutations in a given patient facilitates, among others, cancer prevention or the establishment of personal cancer therapy.
http://www.seqomics.hu/index.php?option=com_content&view=article&id=17&Itemid=121
A list of routinely excepted activities common to colleges and universities is provided further below.
Direct or indirect communications with an official in the legislative or executive branch of the federal government with regard to:
The formulation, modification, or adoption of federal legislation (including legislative proposals, budgets, rules, regulations, executive orders, or any other program, policy, or position of federal government;
The administration or execution of a federal program or policy (including the negotiation, award, or administration of a federal contract, grant, loan, permit, or license)...
http://corporate.dukemedicine.org/AboutUs/government_relations/duhs_community/government_relations_policy

Some examples include a person's age or whether a person smokes.
http://www.cdc.gov/socialdeterminants/Definitions.html

A Google search for Hungarian "*többek között * vagy*" `among others/other things * or' turns up over 7 million hits, including hundreds or thousands of distinct tokens. Here is a small random sample for Hungarian (they were all accessible on 8/1/16).

(53) Amerikai kutatók összefüggést találtak az időskori elbutulás (demencia) és egyes gyakran használt, többek között altatóként vagy allergia kezelésére adott gyógyszerek szedése között.
`American researchers have found a connection between old age mental decline (dementia) and the taking of certain frequently used medications that are prescribed among others as sleep medications or to treat allergia'
http://www.eletforma.hu/test-es-lelek/elbutulast-okozhat-az-allergiagyogyszer/

A szerződésbe rögzíteni kell többek között, hogy mekkora a bérletidíj összege, vagy mikor fizetendő a bérletidíj.
`The contract must specify, among other things, how much is the rent or when payment of the rent is due'
http://docplayer.hu/16171585-Udvozoljuk-itthon-suupohja-regioban-informacios-fuzet-suupohja-regioban-elo-bevandorlok-szamara.html

A politikus tíz pontos „Hazaváró-kiáltványt" tett az asztalra, amelyet a következő hetekben többek között Berlinben, Párizsban, Bécsben vagy épp a szintén sokezer magyarnak új otthont adó Máltán fog megvitatni és kibővíteni az érintettekkel.

`The politician put on the table a ten-pont `Come-home manifesto', which will be discussed and enlarged in the coming weeks with the help of those concerned, among others in Berlin, Paris, Vienna, or indeed in Malta, which is a new home to many thousands of Hungarians'
http://nepszava.hu/cikk/1069744-ujhelyi-orban-erzeketlenul-letagadta-a-problemat

Az ilyen műkövet használják többek között sírkőként, vagy szabadtéri burkolásra (térkő), de készülhet belőle...
`Such artificial stone is used among other things for grave stones or outside pavement; but it can be used for...
www.atriokert.hu/mukooszlop.html

A kiújulás megjósolhatatlan, de többek között fertőzés, stressz vagy terhesség is kiválthatja.
`Recurrence is unpredictable, but among others infection, stress or pregnancy too can trigger it'
www.egeszsegtukor.hu/.../lupuszazezerarcukor.html

Csak remélni tudjuk, a következő hetekben még több ilyenre sor kerül majd többek között Sopronban, Velencén, Hajdúszoboszlón vagy Debrecenben.
`We can only hope that in the coming weeks even more such will be organized, among others in Sopron, Velence, Hajdúszoboszló or Debrecen'
www.kowa.hu/hirek/

de az EU több tagállamában, többek között Belgiumban, Franciaországban vagy Görögországban a terjesztésük egyáltalán nem, vagy csak erős korlátokkal legális.
`... in many EU-member countries, among others in Belgium, France, or Greece, their distribution is not legal or is seriously constrained.'
http://hirhatar.com/buntetest-von-maga-utan-ha-eiffel-tornyos-szelfit-tesz-a-facebookra/

A Kiss Imre által vezetett Tatabányában pályára lépett többek között Szabó György, vagy Csapó Károly, akik még ma is jó játékerőt képviselnek ...
`Among others, György Szabó or Károly Csapó, who continue to be strong today, used to play in [the team] Tatabánya, led by Imre Kiss'
https://www.szeretgom.hu/content/74680-meglepetessel-zarult-a-rozi-kupa

azt bizonyítják, hogy a DDoS támadások további károkhoz vezethetnek, többek között érzékeny adatok elvesztéséhez vagy ellopásához.

`... prove that DDoS attacks may lead to further damages, among others to the loss or theft of sensitive data'
itcafe.hu › Hírek › Biztonság rovat

de többek között Chris Brown, Rihanna vagy P. Diddy is megjelent már a furcsa aranyráccsal a fogain.
`... but among others Chris Brown, Rihanna or P. Diddy too have appeared with the strange gold grill on their teeth'
http://www.life.hu/trend/20131003-kulonleges-fogekszerek-fogkristaly-aranyfog-fogtetko-es-kreativ-fogszabalyzo.html

Exemplifications occur in generic, modal, or at least quantificational contexts, i.e. "multiple-event contexts", in contrast to episodic, "single event" ones. (See Szabolcsi 2002 for a similar observation about PPIs.) It is clear, though, that non-modal, non-quantificational, realis contexts will do -- see many examples above, for instance the last one that translates as `... but among others Chris Brown, Rihanna or P. Diddy too have appeared with the strange gold grill on their teeth'.

I am not ready to propose a semantic analysis for "exemplification *or*", but here are some comments. The use of plain *és* `and' appears to suggest exhaustivity, even when the conjunction occurs in non-focused position (diagnosed by the particle-verb order in *megjelent*).

(54) a. Kati és Mari megjelent a fogadáson.
Kate and Mary showed.up the reception.at
b. Megjelent a fogadáson Kati és Mari.
showed.up the reception.at Kate and Mary
`Kate and Mary showed up at the reception [suggests that they are the only relevant people who did]'

In this respect, *és* `and' contrasts with *is_(és)_ is* `lit. too (and) too = as well as', discussed in some detail in Szabolcsi (2015a):

(55) a. Kati is (és) Mari is megjelent ...
Kate too and Mary too showed up
b. Megjelent ... Kati is (és) Mari is.
showed.up ... Kate too and Mary too
`Kate as well as Mary showed up ... [if anything, suggests that other people did too]'

So one way to avoid the impression of giving a contextually relevant exhaustive list would be to use *is_(és)_ is*, and it could indeed replace *vagy* in the exemplification contexts. (Note also the interesting occurrence of *is* `too' at the end of some of the open lists above.) My hunch is that the fact that *is_(és)_ is* highlights a parallelism between the coordinates makes it less suited for simple exemplification.

I tentatively, but crucially, assume that the exemplification construction is a conjunction, not a disjunction. A little more precisely, I assume that it is *equivalent* to a narrow-scope conjunction. This contrasts with the free-choice cases in (51), where the connective would scope over the possibility modal: *may be in London or Paris = may be in London or may be in Paris*.

If exemplification is, or counts as, a conjunction, that may explain why *or*/*vagy* is happily usable without any hallmark of lifting in (49)-(50). It is not difficult to interpret those sentences as giving just two examples of how one could get hold of a car, and indeed, they are perfectly compatible with both renting and borrowing being seen as viable options in the given situation.

In the absence of a clear analysis of exemplification it is certainly not possible to discard this important case, provided by Ciardelli et al. (2015), as an argument for the direct disjoinability of questions or *wh*-complements. But the possibility to put it to that use should be borne in mind.

5. **A survey of Hungarian disjunctions: single-*hogy* vs. double-*hogy***

5.1 *Naturally occurring data and elicited judgments*

The 1997 claims about Hungarian, cf. (41)-(42), were based on my own observations and judgments. I have attempted to check them against naturally occurring data and the judgments of other speakers. Although I was not able to collect data that can be meaningfully statistically evaluated, it will be useful to report the informal findings. They confirm that Hungarian makes a reasonably sharp distinction between the acceptability and/or interpretation of *single-hogy* and double-*hogy* variants. WooJin Chung, who investigated some Korean counterparts came to the same conclusion (see section 6).

Naturally occurring data. I individually examined ca. 600 distinct Hungarian Google hits produced by searches of the form "*(not) verb hogy wh-word * or (hogy)*", with various different propositional attitude verbs. The searches turned up hits where the connective *vagy* `or' was immediately followed by a second instance of *hogy* and a *wh*-word, as well as hits where it was immediately followed by just a *wh*-word. The basic finding was that when the verb is factive (*tud* `know' or *megtud* `find out') and it is not within the scope of negation or some other operator, *wh*-complement disjunctions with double-*hogy* are overwhelmingly more frequent than ones with a single *hogy*. But indeed, when *(meg)tud* is preceded by *nem* `not', *kevesen* `few people', *ritkán* `rarely', or even *mindig* `always', *wh*-complement disjunctions with a single *hogy* and those with *hogy* in both disjuncts alternate fairly freely. That is, attested forms agree with my 1997 judgments, modulo Haida and Repp's observation about decreasing contexts.

Elicited judgments. In Sept. 2015 I compiled a survey for Hungarian speakers that was distributed to 30 participants by B. Faragó in Hungary.

The survey had 9x4 items (plus fillers), arranged in 4 versions. Each item was judged by 5 to 8 participants. This is a very small sample, but I also had the opportunity to discuss the materials with three Hungarian colleagues, B. Gyuris, A. Lipták, and Zs. Zvolenszky, to whom I am very grateful.

The quadruplets had the following structure. The first two items laid out two siuations and asked participants to choose which of two situations the *single-hogy* and the double-*hogy* sentences better correspond to; the second two items asked participants to choose which of the *single-hogy* and double-*hogy* sentences is better suited to describe those same situations. "Neither" and "both" were among the possible responses.

5.2 *veridical and negated matrix verb contexts (A-B-C-D)*

(A) Kati megmondta nekünk, hogy mennyi idős a néni vagy (hogy) mi a betegsége.
"Kate told us HOGY how old the lady was or (HOGY) what her health problem was"

(B) Edit kiderítette, hogy a vendég honnan származik vagy (hogy) mi a foglalkozása.
"Edith figured out HOGY where the guest hailed from or (HOGY) what his profession was"

(C) Mari lerajzolta, hogy hol kell átvágni az erdőn, vagy (hogy) merre megy a busz.
"Mary sketched HOGY where we can cross the woods or (HOGY) where the bus runs"

(D) Zoli nem tudja, hogy mikor van a tárgyalás, vagy melyik cégnél van a tárgyalás.
"Zoli doesn't know HOGY when the meeting is taking place or (HOGY) at which firm the meeting is taking place"

In veridical (A-B-C), the embedding verb (`told us', `figured out', or `sketched in drawing') was the only operator in the matrix clause. In all those cases double-*hogy* was almost always interpreted with wide scope *or* (indirect disjunction), and the wide scope *or* situation (`this happened or that happened') was almost always expressed using double-*hogy*.

The same wide-scope *or* / double-*hogy* correlation held in (D), where the embeddig predicate was negated (`doesn't know'). Note that Hungarian differs from English in two respects. One, *vagy* `or' is a positive polarity item (PPI) for most speakers, and two, *vagy* happily scopes above an immediately c-commanding negation. Its behavior is like that of English *someone*. See Szabolcsi (2002, 2004).

In veridical (A-B-C), single-*hogy* was mostly interpreted in the same

way, with wide scope *or*, but one third of the speakers picked situations in which someone told us, figured out, or sketched a disjunction. In situations where a disjunction was told us, figured out, or sketched, the preferable expressions were balanced between single-*hogy* and double-*hogy*, but 40% responded that neither is a suitable expression.

In (D) with the negated verb, few speakers interpreted the *single-hogy* sentence with wide-scope *or*; the majority responded that the sentence is not usable; and no one interpreted it as `not>or'. In situations where neither disjuncts were true (`not>or'), almost no one found either single-*hogy* or double-*hogy* applicable. Again, recall that Hungarian *vagy* `or' is a PPI for most speakers.

In sum, in (A-B-C-D), double-*hogy* is almost always interpreted as `(neg) verb wh-CP_1 or (neg) verb wh-CP_2', and that interpretation is highly preferably expressed by double-*hogy*.

But, single-*hogy* is also preferably interpreted as `verb wh-CP_1 or verb wh-CP_2' by two thirds of the speakers, and when the situation would require disjunction within the *wh*-complement, many speakers reject both patterns in the veridical examples and almost all speakers reject it in the negated example. Single-*hogy* is never the preferred expression in any of these situations, although it sometimes sneaks by as a possible option. When it is accepted, it is almost always interpreted with wide scoping *or* in the veridical examples.

My conclusion is that single-*hogy* may be dispreferred even as a syntactic pattern in *wh*-complements. But, moreover, the meaning that it would most straightforwardly carry, i.e. direct disjunction of *wh*-complements, is not generally accepted.

The above are consistent with the following; "WH" stands for "wh-complement clause".

(56) hogy WH_1 vagy hogy WH_2 =
$= \lambda P.P(WH_1) \cup \lambda P.P(WH_2) = \lambda P.P(WH_1) \vee P(WH_2)$

(57) hogy WH_1 vagy WH_2 = $\lambda P.P(WH_1 \cup WH_2)$
this meaning often rejected as inexpressible in (A-B-C-D)

(58) hogy WH_1 vagy WH_2 = $\lambda P.P(WH_1) \cup \lambda P.P(WH_2)$ =
$= \lambda P.P(WH_1) \vee P(WH_2)$
*last resort; usually blocked by double-*hogy *in (A-B-C-D)*

As was discussed in Section 4, there are contexts in which direct disjunctions (narrow-scope *or*) seem to be acceptable: the car-renting example from Ciardelli et al. (2015). See the discussion of (J) below.

5.3 *Decreasing or universal quantifier above the matrix verb (E-F-G)*

(E) Lillának kevés kollégája sejti, hogy milyen filmeket néz, vagy kivel jár.
"Few colleagues of Lilla suspect HOGY what films she watches or (HOGY) who she dates"

(F) Ritkán tudom, hogy a fiam miért van külföldön, vagy (hogy) mikor jön haza.
"I rarely know HOGY why my son is abroad or (HOGY) when he is returning home"

(G) Az orvos mindig megkérdezi, hogy hogy alszom, vagy (hogy) mennyit sétálok.
"The doctor always asks HOGY how I sleep or (HOGY) how much I walk"

In (E-F-G), the matrix clause contained *kevés* 'few', *ritkán* `rarely', or *mindig* `always'. The significance of these is that here *vagy* `or' can take intermediate scope: `quantifier >or>verb'. The reading so obtained is indistinguishable from the `quantifier >verb>or' reading (unless the intensionality of the verb is exploited). So, if in these examples we get a larger number of readings where `or' doesn't take maximal scope, that doesn't have to mean that the disjunction scopes inside the *wh*-complement. Note that PPI *vagy*, like PPI *someone*, is not allergic to merely-decreasing operators.

My survey didn't test whether `or' can scope over the quantifiers in the subject or the adverb, because direct object disjunctions do not usually do that in Hungarian. Whether that is possible was not the main question here.

In (E)-(F), both double-*hogy* and single-*hogy* are almost always interpreted as `few>or >suspect' presented a situation in which the subject rarely knows either of the disjuncts; some speakers equally accepted single-*hogy*, double-*hogy*, or both to express this.

In (G), double-*hogy* two-way correlated with `always>or >asks'. On the other hand, single-*hogy* was interpreted equally as `always>or>asks' and as `always>asks>or'. The `always>asks>or' reading is also equally expressible using single-*hogy* and double-*hogy*.

(E-F-G) indicate that *vagy* in both double-*hogy* and single-*hogy* examples can scope between the embedding verb and the matrix quantifier. This is compatible with the above, making the first step towards the `quantifier>or>verb' readings:

(59) hogy WH_1 vagy hogy WH_2 =
$\lambda P.P(WH_1) \cup \lambda P.P(WH_2) = \lambda P.P(WH_1) \vee P(WH_2)$

(60) hogy WH_1 vagy WH_2 = $\lambda P.P(WH_1) \cup \lambda P.P(WH_2)$ =

$= \lambda P.P(WH_1) \vee P(WH_2)$
not blocked in G-H-I, in contrast to (58)

Why the availability of double-*hogy* doesn't seem to block this interpretation of *single-hogy* remains to be investigated.

Remarkably, in (E-F-G), a situation involving knowledge or utterance of a disjunction (`quantifier>verb>or') could be described using either single-*hogy* or double-*hogy*, to a clearly greater extent than in (A-B-C-D), which contained no quantifier:

(61) hogy WH_1 vagy (hogy) $WH_2 = \lambda P.P(WH_1 \cup WH_2)$
(within the scope of a quantifier)

This may suggests that the direct *wh*-disjunction reading qua reading is okay and is freely available to both constructions; but it remains unclear why being within the scope of a quantifier facilitates this.

The results for (G) suggest a possible counter-analysis, namely, that the readings here are not narrow disjunctions but, rather, non-exhaustive narrow scope conjunctions (exemplifications).

5.4 *Possible exemplifications*

If the reasoning about exemplifications presented in section 4 is by and large correct, then various examples that seemingly contain narrowest-scoping *or*/*vagy* may in fact have exemplification readings: conjunctions in disguise. And the fact that such readings are much more available in (E-F-G) than in (A-B-C-D) receives a natural explanation. (A-B-C-D) are basically single-event sentences, in which *vagy* means plain-vanilla `or'.

In item (H), almost exactly replicating a naturally-occurring datum, all 4 versions asked about wide-scope `or' versus wide-scope `as well as':

(H) A szerződésben rögzíteni kell többek között, hogy mekkora a bérleti díj összege, vagy (hogy) mikor fizetendő a bérleti díj.
"The contract must specify among other things HOGY what is the amount of the rent or (HOGY) when the rent is to be paid"

Többek között ... hogy WH_1 vagy (hogy) WH_2 were happily accepted as true in `as well as' situations. And situations in which both "specify WH_1" and "specify WH_2" were true were judged to be describable using double-*hogy* or using either pattern. In contrast, situations in which only one of the "specify WH_1" and "specify WH_2" options was true were preferably described using double-*hogy* by most participants; this squares with the above-found correlation between wide-scope *vagy* and double-*hogy*.

Item (J) was directly based on Ciardelli et al. (2015):

(J) Tudjuk, hogy hol lehet autót bérelni, vagy (hogy) kinek van egy, amit kölcsönvehetnénk.
"We know HOGY where cars can be rented or (HOGY) who has one that we could borrow"

The authors speculate, and I agree, that what makes this example different from the others is that the two clauses are variations on the same theme: how we can get hold of a car. Ciardelli et al. suggest that here we have a single decision problem in the sense of van Rooij, and the easy identifiability of this decision problem makes low-scoping *or* possible. In other words, the suggestion is that the direct disjunction of *wh*-complements is semantically okay, but it is pragmatically difficult when it is not easy to identify a single decision problem that the disjunction describes.

The Hungarian survey distinguished two interpretations. In one, we are confident that we know of at least one way to get hold of a car, although we are not yet sure which of the methods under consideration will work out (=at least one option). In the other, we know two or more ways to get hold of a car (=multiple options). The latter interpretation is inspired by the finding that disjunctions can serve to convey `as well as', especially when the possibility of further options is maintained, i.e. as exemplifications.

In (J), double-*hogy* was almost always interpreted as saying that we know of multiple options, which is compatible with exemplification. One speaker responded that it can mean either multiple options or at least one option.

Single-*hogy* was balanced: three speakers interpreted it with at least one option, one with multiple options, and two as good for both. And conversely, situations in which we know multiple options vs. at least one, were described with single-*hogy*, double-*hogy*, or both, evenly distributed. Two speakers responded, though, that the at least one option (the alleged low-scoping disjunction) was not expressible either way. In sum, the multiple options interpretation/situation is more prevalent than the at least one option interpretation/situation. This speaks for the significance of exemplification, and perhaps against that of the identifiable single decision problem.

It is to be stressed that scattered judgments by 4 to 6 speakers do not constitute a strong basis for drawing a theoretical conclusion. But even these preliminary data are suggestive in showing that both the single-option scenario and the multiple-options scenario are possible -- but they make a difference. If we were dealing within a plain disjunction, there should not be a difference between these two.

Returning to (E-F-G), it is possible that the prevalence of these interpretations is not real:

(59) hogy WH_1 vagy WH_2 = $\lambda P.P(WH_1 \cup WH_2)$
(within the scope of a quantifier)

(60) hogy WH_1 vagy hogy WH_2 = $\lambda P.P(WH_1 \cup WH_2)$
(within the scope of a quantifier)

Instead, in at least some of the cases, we probably have conjunctions:

(62) hogy WH_1 vagy WH_2 = $\lambda P.P(WH_1) \wedge P(WH_2) \wedge ...$
(in a multiple-event context)

(63) hogy WH_1 vagy hogy WH_2 = $\lambda P.P(WH_1) \wedge P(WH_2) \wedge ...$
(in a multiple-event context)

6. Korean

The Korean examples and judgments in Szabolcsi (1997) were contributed by Seungho Nam (p.c.). In 2015, WooJin Chung constructed counterparts of the Hungarian survey questions; they were judged by him and several other Korean speakers. I am grateful for his help.

The Korean morpheme that I take to be the subordinating complementizer in *wh*-interrogatives is *ci*. One-*ci* and double-*ci* coordinations in Korean further differ in ways that Hungarian coordinations do not that I do not have space to discuss here.

The Korean data overall support the same generalizations as the Hungarian data. But interestingly, conjunctive readings surfaced even more robustly than Hungarian exemplifications.

The counterparts of veridical (A-B-C) were systematically judged to be unacceptable with one *ci,* and to carry the wide-scope `or' reading with two *ci*'s. One example:

(B) *One 'ci'*

*John-un sonnim-i eti-eyse o-ass-kena ku-uy cikep-i mwues-i-n-ci
John-TOP guest-NOM where-from come-PAST-or he-GEN profession-NOM what-COP-PRES-CI
alanay-ss-ta.
figure.out-PAST-DECL
'John figured out where the geust comes from or what his profession is.'

Two 'ci's

John-un sonnim-i eti-eyse o-ass-nun-ci hokun ku-uy cikep-i
John-TOP guest-NOM where-DAT come-?-CI or he-GEN profession-NOM
mwues-i-n-ci alanay-ss-ta.
what-COP-PRES-CI figure.out-PAST-DECL
'John figured out where the geust comes from or what his profession is.'
Wide scope OR reading: figured out where or figured out what

For some reason, the negated example (D) did not allow the intermediate-scoping reading. Disjunction in Korean (in contrast) to Hungarian, is not a PPI.

(D)

One 'ci'

*John-un hoyuy-ka eti-eyse iss-kena etten hoysa-eyse hoyuy-ka
John-TOP meeting-NOM where-at COP-or which firm-at meeting-NOM
iss-ul-ci al-ci mos-ha-n-ta.
COP-?-CI know-CI not-do-PRES-DECL
'John doesn't know when the meeting will take place or at which firm the meeting will take place.'

Two 'ci's

John-un hoyuy-ka encey iss-ul-ci hokun etten hoysa-eyse hoyuy-ka
John-TOP meeting-NOM when COP-?-CI or which firm-at meeting-NOM
iss-ul-ci al-ci mos-ha-n-ta.
COP-?-CI know-CI not-do-PRES-DECL
'John doesn't know when the meeting will take place or at which firm the meeting will take place.'
Wide scope OR reading: doesn't know this or doesn't know that

Korean does not have merely-decreasing quantifiers, so (E)-(F) are absent.

(G)

One 'ci'

na-uy uysa-nun pangmwunha-l ttay-mata nay-ka ettehkey ca-kena
I-GEN doctor-TOP visit-? time-each I-NOM how sleep-or
elmana ket-nun-ci mwulepo-n-ta.
how much walk-?-CI ask-PRES-DECL
'My doctor asks at every visit how I sleep AND how much I walk.'

Only the conjunction reading arises for me.
Yes, this sentence indicates that the *one-ci* sentence is not simply syntactically bad. However, it is not clear to me why the conjunction reading arises.

Two 'ci's

na-uy uysa-nun pangmwunha-l ttay-mata nay-ka ettehkey ca-nun-ci
I-GEN doctor-TOP visit-? time-each I-NOM how sleep-?-CI
hokun elmana ket-nun-ci mwulepo-n-ta.
or how much walk-?-CI ask-PRES-DECL
'My doctor asks at every visit how I sleep or/and how much I walk.'

Either the conjunction reading or the disjunction reading can arise.

(J)

One 'ci'

*kyeyakse-nun yele kes-tul cwung welsey-ka elma-i-kena encey
contract-TOP many thing-PL among rent-NOM how.much-COP-or when
imtay-ka manlyo-toy-nun-ci myengsiha-eya ha-n-ta.
rent-NOM expire-INCH-?-CI specify-must-PRES-DECL
'The contract must specify among other(many) things what the rent amount is or when the rent is due.'

Two 'ci's

kyeyakse-nun yele kes-tul cwung welsey-ka elma-i-n-ci hokun encey
contract-TOP many thing-PL among rent-NOM how.much-?-CI or when
imtay-ka manlyo-toy-nun-ci myengsiha-eya ha-n-ta.
rent-NOM expire-INCH-?-CI specify-must-PRES-DECL
'The contract must specify among other(many) things what the rent amount is or when the rent is due.'

The conjunction reading arises for me and another informant, but two other informants preferred the inclusive 'or' reading.

How did you distinguish conjunction vs inclusive OR?

What I meant by conjunction reading is that I can only utter the sentence only if the two disjuncts are true. However, having a second look, it feels like I can utter the sentence even when only one of the disjuncts is true, and my previous judgment may be due to world knowledge.

More on exemplification:

One note on exemplification:

Korean has a morpheme *tung*, which has two meanings according to the dictionary:

(i) a word which expresses that there are more of the same kind

(ii) a word which is used after enumerating two words or more, and restricts the target of description to the enumerated words.

I think using this morpheme explicitly marks 'exemplifcation.'

kyeyakse-nun welsey-ka elma-i-n-ci hokun encey imtay-ka
contract-TOP rent-NOM how.much-?-CI or when rent-NOM
manlyo-toy-nun-ci tung-ul myengsiha-eya ha-n-ta.
expire-INCH-?-CI TUNG-ACC specify-must-PRES-DECL
'The contract must specify (among other things) what the rent amount is or when the rent is due.'

(J)

One 'ci'

Q: wuli-nun ettehkey cha-lul kwuha-ci?
we-TOP how car-ACC find-CI
'How do we get a car?'

A: wuli-nun wuli-ka eti-eyse cha-lul pilli-l swu iss-kena nwu-ka
we-TOP we-NOM where-at car-ACC rent-FUT? way COP-or who-NOM
wuli-ka pilli-l swu iss-nun cha-lul kaci-ko iss-nun-ci a-n-ta.
we-NOM rent-? way COP-REL car-ACC have-PROG-?-CI know-PRES-DECL
'We know where we can rent a car or who has one that we can borrow.'

I think the sentence means that the matrix subject has disjunctive knowledge.

Two 'ci'

Q: wuli-nun ettehkey cha-lul kwuha-ci?
we-TOP how car-ACC find-CI
'How do we get a car?'

A: wuli-nun wuli-ka eti-eyse cha-lul pilli-l swu iss-nun-ci hokun
we-TOP we-NOM where-at car-ACC rent-FUT? way COP-?-CI or
nwu-ka wuli-ka pilli-l swu iss-nun cha-lul kaci-ko iss-nun-ci a-n-ta.
who-NOM we-NOM rent-? way COP-REL car-ACC have-PROG-?-CI know-PRES-DECL
'We know where we can rent a car or who has one that we can borrow.'

Here too.

The (J) judgments contrast with the Hungarian ones. On the other hand, a conjunctive reading arises in the following example (no Hungarian counterpart). We do not yet understand these facts.

(O) *One 'ci'*

na-nun nanwusseym-i ettehkey tongcakha-kena tancoseng-i mwues-i-n-ci
I-TOP division-NOM how operate-or monotonicity-NOM what-COP-?-CI
a-n-ta.
know-PRES-DECL
'I know how division works AND what monotonicity is.'

Two 'ci's

na-nun nanwusseym-i ettehkey tongcakha-nun-ci hokun tancoseng-i
I-TOP division-NOM how operate-?-CI or monotonicity-NOM
mwues-i-n-ci a-n-ta.
what-COP-?-CI know-PRES-DECL
'I know how division works AND what monotonicity is.'

The preferred interpretation for both the one 'ci' sentence and the two 'ci's sentence is the conjunction reading. That is, I understand how division works AND what monotonicity is. As for the disjunction reading, it is not available in the direct disjunction sentence. In contrast, it can arise in the two ci-sentences, but only if the speaker, I, know the fact that I know either of the disjuncts but intentionally say 'I understand how division works OR what monotonicity is'.

7. Conclusion

This paper has made two main claims. One is that the presence of a subordinating complementizer in each member of a coordination very strongly correlates with indirect coordination (first lift, then coordinate) in Hungarian and in Korean. The second claim was that especially veridical contexts greatly prefer indirect *wh*-complement disjunction, as diagnosed by subordinators, and it was observed that even non-veridical contexts can be handled that way, using intermediate-scope lifting. Some potential counterexamples remained, which may or may not be cases of exemplification (conjunction masquarading as disjunction).

If these, mainly descriptive results are by and large correct, we are left

with a theoretical question: why is it that *wh*-complements prefer, or even demand, indirect disjunction? Recall that the partition theory predicted this, but there have been good reasons to abandon the partition theory. So the question arises anew.[2]

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[2] Szabolcsi (2015b) observed that Inquisitive Semantics could make such a prediction. Groenendijk & Roelofsen (2009) and AnderBois (2012) make the following assumptions:

(i) A question is both inquisitive and non-informative.
(ii) φ is inquisitive iff it contains more than one alternative.
(iii) φ is non-informative iff its alternatives cover the set of worlds (do not exclude any possibility).

To these we add a proposal from Roelofsen and Farkas (2015: XX):

> Following Zimmermann (2000), Pruitt (2007), Biezma (2009), Biezma and Rawlins (2012), and Roelofsen (2013b), we will think of these types of sentences as *lists*. ... The only non-standard provision is that the non-inquisitive projection operator, !, is applied to every list item. The rationale for this is that every list item is to be seen, intuitively speaking, as one block, i.e., as contributing a single possibility to the proposition expressed by the list as a whole. This is ensured by applying !, which, roughly speaking, takes a set of possibilities and returns its union...
>
> *Rule for translating the body of a list*:
> [$item_1$ *or . . . or* $item_n$] ≈> $!\varphi_1 \vee ... \vee !\varphi_n$.

Now take the question, *Who is the father or who is the mother?* If *or* flattened out the disjuncts, then each disjunct would have just one alternative. Their ∪ would be the same, i.e. it would not be inquisitive.

adam	adam
eve	bonnie
clyde	clyde
eve	bonnie

If so, then Q_1 *or* Q_2 would not qualify as a question. Note that now *or* ≠ ∪, just something defined in terms of ∪**.**

However, this combination of assumptions is not one that Ciardelli et al. (2015) entertain, and it would definitely require supporting evidence.

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