

# What do quantifier particles do?

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**Abstract** In many languages, the same particles that form quantifier words also serve as connectives, additive and scalar particles, question markers, roots of existential verbs, and so on. Do these have a unified semantics, or do they merely bear a family resemblance? Are they aided by silent operators in their varied roles—if yes, what operators? I dub the particles “quantifier particles” and refer to them generically with capitalized versions of the Japanese morphemes. I argue that both MO and KA can be assigned a stable semantics across their various roles. The specific analysis I offer is motivated by the fact that MO and KA often combine with just one argument; I propose that this is their characteristic behavior. Their role is to impose semantic requirements that are satisfied when the immediately larger context is interpreted as the meet/join of their host’s semantic contribution with something else. They do not perform meet/join themselves. The obligatory vs. optional appearance of the particles depends on whether the meet/join interpretations arise by default in the given constellation. I explicate the proposal using the toolkit of basic Inquisitive Semantics.

**Keywords** Compositionality · Cross-linguistic semantics · Particles · Inquisitive Semantics · Conjunction · Disjunction · Quantifier

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## 1 To meet and join, or not to meet and join?

### 1.1 Quantifier particles cross-linguistically

This paper is part of a larger project to investigate the compositional semantics of quantifier words. Taking apart *someone* and *everyone* and specifying what *some*, *every*, and *one* mean are not daunting tasks. But, in many languages, the same particles that form quantifier words also serve as connectives, additive and scalar particles, question markers, roots of existential verbs, and so on. I will dub these particles “quantifier particles.” The interesting part of the project begins when we set out to investigate whether and how the same interpretations of the particles that work well inside the quantifier words extend to their wider contexts.

English, German, and French may not make this task seem urgent, but many other languages do. I am aware of good literature pertaining to various languages that belong to a vast Sprachbund (linguistic alliance) comprising Athabaskan, East Asian, South-East Asian, Slavic, and Finno-Ugric languages. Consider the following samples. Hungarian *ki* and Japanese *dare*, usually translated as ‘who’, are indeterminate pronouns in the terminology of Kuroda (1965). *Ki* and *dare* form ‘someone’ and ‘everyone’ with the aid of morphemes whose more general distribution is partially exemplified below. The joint distribution of Hungarian *vala/vagy* and etymologically unrelated *-e* corresponds, roughly, to that of Japanese *-ka*. The joint distribution of *mind* and etymologically unrelated *is* corresponds to that of *-mo*. (In (1d,e) the dashes indicate the absence of particles.)

- |        |                        |                        |                                  |
|--------|------------------------|------------------------|----------------------------------|
| (1) a. | <b>vala-ki</b>         | <b>dare-ka</b>         | ‘someone’                        |
| b.     | <b>(vagy) A vagy B</b> | <b>A-ka B(-ka)</b>     | ‘A or B’                         |
| c.     | <b>vagy száz</b>       | <b>hyaku-nin-toka</b>  | ‘some one hundred = approx. 100’ |
| d.     | <b>val-, vagy-</b>     | –                      | ‘be’ participial & finite stems  |
| e.     | –                      | <b>dare-ga V...-ka</b> | ‘Who Vs?’                        |
| f.     | <b>S-e</b>             | <b>S-ka</b>            | ‘whether S’                      |
|        |                        |                        |                                  |
| (2) a. | <b>mind-en-ki</b>      | <b>dare-mo</b>         | ‘everyone/anyone’                |
| b.     | <b>mind A mind B</b>   | <b>A-mo B-mo</b>       | ‘A as well as B, both A and B’   |
|        | <b>A is (és) B is</b>  |                        | ‘A as well as B, both A and B’   |
| c.     | <b>A is</b>            | <b>A-mo</b>            | ‘A too/even A’                   |

I will use the capitalized versions KA and MO as generic representatives of these particles, not as specifically Japanese morphemes.

Szabolcsi (2010, Chap. 12.5, 2012), and Szabolcsi et al. (2014) discuss similar data from a syntactic, semantic, and typological perspective, and raise various questions for compositionality.

- (3) a. Do the roles of each particle form a natural class with a stable semantics?  
 b. Are the particles aided by additional elements, overt or covert, in fulfilling their varied roles? If yes, what are those elements?  
 c. What do we make of the cross-linguistic similarities and differences in the distribution and interpretation of the particles?

These questions are important for two general reasons.

First, if multiple languages employ the same morphemes for the above roles and, conversely, languages do not mix and match such morphemes arbitrarily, then we would miss significant generalizations by not taking clusters like (1) and (2) seriously.

I believe that there is solid evidence for the cross-linguistic robustness of such clusters although, as (1) and (2) already show, there are cross-linguistic differences regarding exactly what roles the individual particles play.<sup>1</sup> Ultimately, the contrast between Japanese/Hungarian-type languages vs. English/French-type languages comes under the same heading.

The second reason to take the clusters seriously is that theories have emerged in the past two decades that do not draw a demarcation line between morphology and syntax. Distributed Morphology, Nanosyntax, and certain varieties of Minimalist syntax are cases in point.<sup>2</sup> Unlike traditional Chomskyan lexicalism, these theories build sentences directly from morphemes or even features, and do not have a level of “words.” If these theories are on the right track and morpho-syntax does not deal in words, then we cannot take complex word meanings to be compositional primitives. When the same particles that occur in ‘someone’ and ‘everyone’ lead busy lives outside quantifier words, compositional semantics should strive to account for the full array.

The two kinds of motivation bear on each other. The task of dealing with patterns of cross-linguistic variation is somewhat new in formal semantics, but it is very familiar in morphology and syntax. For example, some of the variation that we see in the distribution of the particles is highly reminiscent of patterns of syncretism and

<sup>1</sup> Haspelmath (1997) claimed that the Japanese-style identity of the morphemes occurring in indefinites and in disjunctions, cf. (1a, b), is a rare phenomenon. But Bhat (2000), Jayaseelan (2001, 2008) and Slade (2011) present extensive data that contradict the rarity claim, and Szabolcsi et al. (2014) point out that Haspelmath’s survey missed critically relevant data even in one of the languages in his closely scrutinized sub-sample: Hungarian. Cable (2010) argues that Japanese *ka* represents a case of massive homonymy, based on Tlingit, a language in which only the markers of indefinites and wh-questions coincide in form. But Slade (2011) offers a historical analysis of Japanese, Sinhala, and Malayalam that shows the homonymy claim to be unwarranted. Slade himself accounts for the cross-linguistic differences with reference to syntactic features, epistemic semantics, and the incorporation of existential closure into certain indeterminate pronouns. Intriguing mix-and-match cases also exist: Zimmermann (2009) discusses Korean and Hausa, languages in which disjunction morphemes participate in universal readings. Zimmermann offers careful analyses but does not make a final choice.

<sup>2</sup> For Distributed Morphology, see Halle and Marantz (1994), Harley (2012), and Bobaljik (2012). For Nanosyntax, see Starke (2009) and Caha (2009). For versions of Minimalism that do not recognize words as building blocks, see Koopman and Szabolcsi (2000), Julien (2002), Sigurdsson (2004), Koopman (2005), and Kayne (2005, 2010). Certain analyses of superlatives are also good examples of the “no word boundaries” approach, see Hackl (2009) and Szabolcsi (2012). Szabolcsi et al. (2014) offer an overview and general discussion.

grammatically conditioned allomorphy. The fact that the present project is partially motivated and definitely supported by theories of morpho-syntax holds out the hope that we can learn from how those theories interpret and account for patterns of variation.

This paper begins to answer the questions in (3) but does not undertake to accomplish it all in one fell swoop. It seeks to identify the common core in the semantics of “quantifier particles” in languages of the Japanese/Hungarian type, and to explain certain fundamental facts about the distribution of KA and MO particles. Accounting for the finer distribution of the particles within individual languages and across languages is left for further research, although some pointers are provided, based on recent literature.

## 1.2 A promising perspective: join and meet

Regarding the question whether the roles of each particle form a natural class with a stable semantics, a beautiful generalization caught the eyes of many linguists working with data of this sort (Gil 2008; Haspelmath 1997; Jayaseelan 2001, 2008, 2011, among others; see Szabolcsi 2010, Chap. 12). In one way or another, the roles of KA involve existential quantification or disjunction, and the roles of MO involve universal quantification or conjunction.

Existential quantification, disjunction, and set union are special cases of lattice-theoretic **join**. Universal quantification, conjunction, and set intersection are special cases of lattice-theoretic **meet**. Join and meet can be equivalently defined as operations or as **least upper bounds** and **greatest lower bounds** in partially ordered sets.

Using the above generalization, the suggestion is this<sup>3</sup>:

- (4) KA expresses lattice-theoretic join ( $\cup$ ), MO expresses lattice-theoretic meet ( $\cap$ ).

Alternative Semantics has thrown a new light on the signature environments of KA. Hamblin (1973), Kratzer and Shimoyama (2002), Simons (2005a, b), Alonso-Ovalle (2006), Aloni (2007), AnderBois (2010, 2012), and others proposed that not only polar and wh-questions but also declaratives with indefinite pronouns or disjunctions contribute sets of multiple classical propositions to interpretation. They contrast with declaratives that are atomic or whose main operations are negation, conjunction, or universal quantification; these contribute singleton sets of classical propositions. If the universe consists of Kate, Mary, and Joe, we have,

<sup>3</sup> In terms of operations: a lattice is an algebra  $\langle A, \cap, \cup \rangle$ , where  $\cap$  and  $\cup$  are two-place operations satisfying idempotency, commutativity, associativity, and absorption.

In terms of partial ordering: a lattice is a partially ordered set  $\langle A, \leq \rangle$  that is closed under meet and join. For any subset  $X$  of  $A$ ,  $c \in A$  is a lower bound of  $X$  iff for every  $x \in X$ ,  $c \leq x$ . The greatest of the lower bounds, if it exists, is the glb, infimum of  $X$ . The meet of  $a$  and  $b$ ,  $a \cap b$ , is the glb of the two-element subset  $\{a, b\}$  of  $A$ . Similarly, the join of  $a$  and  $b$ ,  $a \cup b$  is the least upper bound (lub, supremum) of the two-element subset  $\{a, b\}$  of  $A$ . See Landman (1991, Chap. 6).

- (5) a. Who dances?, Someone dances, Kate or Mary or Joe dances  
 $\{\{w: \text{dance}_w(k)\}, \{w: \text{dance}_w(m)\}, \{w: \text{dance}_w(j)\}\}$   
 b. whether Joe dances  
 $\{\{w: \text{dance}_w(j)\}, \{w: \text{not dance}_w(j)\}\}$
- (6) a. Joe dances  
 $\{\{w: \text{dance}_w(j)\}\}$   
 b. Everyone dances  
 $\{\{w: \text{dance}_w(k) \ \& \ \text{dance}_w(m) \ \& \ \text{dance}_w(j)\}\}$

Inquisitive Semantics (see Ciardelli et al. 2012, 2013) develops a notion of propositions as non-empty, downward closed sets of information states. The sentences in (5) and (6) are recognized as expressing inquisitive and non-inquisitive propositions, respectively, and disjunction and conjunction re-emerge as (Heyting-algebraic) join and meet. In particular, letting  $\llbracket \phi \rrbracket$  be an Inquisitive Semantic proposition, (5)–(6) re-emerge as (5')–(6').<sup>4</sup> See details in Sect. 2.

- (5') a. Who dances?, Someone dances, Kate or Mary or Joe dances  
 $\llbracket \text{Kate dances} \rrbracket \cup \llbracket \text{Mary dances} \rrbracket \cup \llbracket \text{Joe dances} \rrbracket$   
 b. whether Joe dances  
 $\llbracket \text{Joe dances} \rrbracket \cup \llbracket \neg \text{Joe dances} \rrbracket$
- (6') a. Joe dances  
 $\llbracket \text{Joe dances} \rrbracket$   
 b. Everyone dances  
 $\llbracket \text{Kate dances} \rrbracket \cap \llbracket \text{Mary dances} \rrbracket \cap \llbracket \text{Joe dances} \rrbracket$

The upshot is that the linguistic insights of Alternative Semantics and their reincarnation in Inquisitive Semantics offer an even more interesting way to unify KA's environments than classical theories. Moreover, the possibility to treat KA as a join and MO as a meet operator is maintained, although in a slightly modified algebraic setting. Among other things, this preserves the continuity with the research tradition in Keenan and Faltz (1985), Szabolcsi and Zwarts (1993), and Katzir and Singh (2013).

In other words, it looks like the core roles of KA and MO can be assigned a stable semantics, and a simple one at that.<sup>5</sup>

<sup>4</sup> For simplicity, assume that wh-questions carry an existential presupposition and do not have a partition semantics. Inquisitive Semantics supports different linguistic implementations; this one allows us to bring all three examples under the same heading for initial illustrative purposes.

<sup>5</sup> There is a line of research (Hagstrom 1998; Yatsushiro 2009; Cable 2010; Slade 2011) that analyzes KA and its cross-linguistic counterparts as choice-function variables, to be bound by structure-building existential closure. This literature takes KA's occurrence in indefinites and wh-questions as a point of departure. The basic intuition is that KA occurs in the presence of alternatives, lets them project up across island boundaries and, according to Cable and Slade, serves, so to speak, to "domesticate alternatives." Especially interesting is Slade (2011), because he extends this approach to KA in yes/no questions and disjunctions. For a comparison between the Inquisitive approach and the choice functional one, see Sect. 2.

### 1.3 Mismatch problems: too few arguments, too many operators

There are general linguistic problems with this beautiful approach. First, in many unrelated languages the same MO particle occurs in each conjunct. (In three-way conjunctions, there are three MOs.) Hungarian *is*, Russian *i*, Romanian *și*, and Japanese *mo* are among the examples.

- |                               |   |
|-------------------------------|---|
| (7) Schematically             | Hungarian                               |
| John MO Mary MO danced.       | János <b>is</b> Mari <b>is</b> táncolt. |
| ‘John danced and Mary danced’ | ‘John danced and Mary danced’           |

If all MOs are doing the same thing, then MO cannot be a meet (conjunction) operator.

Likewise, in some languages the KA-style particle obligatorily occurs in each disjunct, but the whole construction has the same meaning as a plain English inclusive disjunction.<sup>6</sup> Slade (2011) was the first to identify the pattern in (8) as a critical one to account for. Sinhala *-hari* and *-də* (declarative and interrogative disjunctions, respectively) and Malayalam *-oo* are among the examples. Japanese *ka* is not obligatory in the second disjunct (Kuroda 1965, pp. 85–86), but recall that I am using capitalized KA as a generic representative of the class.

- |                         |  |
|-------------------------|--|
| (8) Schematically       | Sinhala (Slade 2011)                                 |
| John KA Mary KA danced. | Gunəpālə <b>hari</b> Chitra <b>hari</b> gaməṭə giyā. |
| ‘John or Mary danced’   | ‘G or C went to the village’                         |

If all KAs are doing the same thing, then KA cannot be a join (disjunction) operator.

The critical question is, should we take each instance of MO and KA seriously? There is good reason to do so. In all the above languages, MO can occur unarily, in which case it plays the role of an additive particle like *too*.

- |                              |                          |
|------------------------------|--------------------------|
| (9) Schematically            | Hungarian                |
| Mary danced. John MO danced. | János <b>is</b> táncolt. |
| ‘John, too, danced’          | ‘John, too, danced’      |

The time-honored analysis of *too* is that it adds the presupposition that the predicate holds of some discourse-salient entity other than the one in focus. Although ultimately the truth of (9) entails that John danced **and** someone else danced, it would be a stretch to say that English *too*, Hungarian *is*, and other additive particles are plain meet (conjunction) operators.

It turns out that *or* has a use that is fundamentally similar to that of *too*. The two sentences in (10) might be uttered by the same speaker or by different speakers. *Or*;

<sup>6</sup> Many better-known languages iterate disjunctions with an exhaustifying effect, e.g. French *ou A ou B*; Russian *ili A ili B*, Hungarian *vagy A vagy B*. The Sinhala and Malayalam constructions discussed in the text do not fall into this category (B. Slade, p.c. and K.A. Jayaseelan, p.c.). *Either... or...* will be compared to both constructions in Sect. 3.2.5.

*John is at home* presupposes the availability of a discourse-salient proposition and presents it and the proposition that John is at home as alternative possibilities.

- (10) Mary is at home.  
**Or** (perhaps), John is at home.

But KA also has dedicated unary varieties that attach to a numeral to form an approximate numeral. Hungarian *vagy* (plain-vanilla ‘or’) and Japanese *toka* are examples.

- |                              |                                      |
|------------------------------|--------------------------------------|
| (11) Schematically           | Hungarian                            |
| John bought 100 KA books.    | János vett <b>vagy</b> száz könyvet. |
| ‘John bought some 100 books’ | ‘John bought some 100 books’         |

Lest the unary KA and reiterated KA data seem too exotic, note that alternative questions in the sense of Krifka (2001) illustrate both cases. This can already be seen from English (12a, b), which Karttunen (1977) treated as equivalent, without any comment on compositionality:

- |  |   |
|--|---|
| (12) a. <b>if/whether</b> Mary danced          | {{w: dance <sub>w</sub> (m)},{w: not dance <sub>w</sub> (m)}} |
| b. <b>if/whether</b> Mary danced <b>or</b> not | {{w: dance <sub>w</sub> (m)},{w: not dance <sub>w</sub> (m)}} |

Russian *li* and Hungarian *-e* and *vagy* are KA-particles that occur in such alternative questions, in main as well as in complement clauses. (13a) and (13b) demonstrate that unary, clausal KA alternates with ‘or(=KA) not,’ just as Karttunen (1977) would predict. But in (13c), both are present. The equivalence of these variants will be taken up in some detail in Sect. 3.2.3.<sup>7</sup>

- |                               |  |
|-------------------------------|--|
| (13) Schematically            | Russian  |
| a. Mary danced KA             | (Ja sprosil) tancevala- <b>li</b> Masha                |
| b. Mary danced or(=KA) not    | (Ja sprosil) tancevala Masha <b>ili</b> net            |
| c. Mary danced KA or(=KA) not | (Ja sprosil) tancevala- <b>li</b> Masha <b>ili</b> net |
| ‘Did M dance or not?’ and     | ‘Did M dance or not?’ and                              |
| ‘whether M danced or not’     | ‘(I asked) whether M danced or not’                    |

In sum, both the reiterated and the unary MO and KA examples indicate that MO and KA cannot embody the meet and join operators.

Where does that leave us with respect to the optimistic conclusions of the previous section? I believe that the optimistic conclusions are correct—but they pertain to the meanings of the **larger constructions** in which the KA and MO particles occur. They do not and cannot pertain to semantic composition, in particular, to exactly what the particles contribute. Their contribution remains a puzzle. The central claim of this paper will be this:

<sup>7</sup> Not all Russian speakers accept the (13c) pattern, but the Russian National Corpus offers many examples, classic sources among them, e.g. *On chuvstvoval, chto na nego smotrjat i zhdut, osramitsja li on ili net svoim ovetom*. ‘He felt that they were watching him and waiting [to see] whether or not he would shame himself with his answer’ (Dostoevsky, Notes from the House of the Dead).

- (14) *MO and KA inhabit contexts interpreted as meets and joins, but they are not meet and join operators themselves.*

Instead, MO and KA impose semantic requirements that are satisfied when their contexts are interpreted, respectively, as the meet (greatest lower bound) and the join (least upper bound) of the contribution of their hosts and something else.

The rest of this paper will outline how MO and KA accomplish this. Before that, we situate the claim in a bigger picture.

#### 1.4 Is the behavior of KA and MO unusual?

Pending details, the proposed view of KA and MO is similar to a widely held view of negative concord markers. Most analyses do not consider NC markers to be negations, although they signal the presence of a real negation which, following Ladusaw (1992), is considered to be phonetically null. On this view even the pre/post-verbal negative particle itself may be just a negative concord marker.<sup>8</sup> Beghelli and Stowell (1997) proposed a similar approach to *each* and *every*: they signal the presence of a distributive operator, but are not distributive operators themselves. Kusumoto (2005) proposed that past tense morphology on the verb merely contributes a time variable, to be quantified over by the operator PAST that sits much higher in the structure.

In other words, the claim that KA and MO only “point to” join and meet is not outlandish; it may well represent the norm in the morpho-syntactic correlates of logical operators. Such a claim was first made by Carlson (1983, 2006).<sup>9</sup> Carlson argues that functional elements often present a mismatch in form and interpretation. Multiple elements correspond to one bit of meaning, or an element occurs in a different place than where it is interpreted, or an element does not seem to make the same contribution everywhere it occurs, or an element seems to be meaningless or, conversely, a bit of meaning seems to be contributed by a null element. His examples include the second-position clitic conjunction *-que* of Latin, past tense marking in English, haplology of postpositions in Japanese, negative concord in Romance, the multiple marking of number in English *these horses*, dependent plurals, spurious *se* in Spanish, habitual markers in Hindi counterfactuals that do not indicate habituality, the obligatory presence or absence of the definite article in *in prison* and *on the radio* (for particular meanings, in American English), and so on. Carlson’s (1983) list interestingly overlaps with my list, based on more recent literature, and with some of the data I will discuss later.

Carlson does not offer detailed analyses, but he forcefully makes a general point. There is a learning problem if the learner is supposed to figure out functional meanings from what he/she hears. Carlson’s solution to the problem is that

<sup>8</sup> But see de Swart and Sag (2002) for the view that the negative concord reading is a product of polyadic (resumptive) quantification applied to multiple genuinely negative quantifiers.

<sup>9</sup> I thank Roni Katzir for making me aware of this work by Carlson and its relevance to this enterprise. See also Katzir (2011) on “poly-(in)definiteness” in Danish, Icelandic, and Greek.



functional elements themselves are meaningless. The functional meanings are carried by features or other phonetically null operators that appear on the phrases over which they scope, and their effects percolate down to heads in order to receive expression, in one way or another.

### 1.5 Are the requirements imposed by MO and KA syntactic or semantic?

Thus, on Carlson's view, functional elements merely give the learner clues as to what real carriers of meaning are silently lurking in the structure, and where they might be lurking. Notice now that the specific proposals by Ladusaw, Beghelli & Stowell, and Kusumoto cited above are all in the same spirit. The iterated KA and iterated MO cases could be approached in that way as well. One could say that KA and MO are meaningless syntactic elements that merely point to phonetically null join and meet operators higher in the structure. On that approach, the requirements of KA and MO would be **syntactic requirements**. That is in fact the position taken by Kratzer (2005).<sup>10</sup>

In this paper I follow a different path. I will attempt to formulate **semantic requirements** to achieve a similar effect. If the semantic approach looks harder than the syntactic one, it is worth showing that it is viable. Like Carlson, I will invoke various phonetically null operations but, as we shall see later, the need for those is independent of whether KA and MO carry syntactic or semantic requirements.

MO is a good starting point, because we have a standard analysis of *too* that easily extends to MO in *John MO ran* 'John, too, ran' (I put MO as scalar 'even' aside). *John MO ran* is thought to assert that John ran, and to **presuppose** that a salient individual distinct from John ran. So MO can be seen as a "semantic pointer"—it points to a fact not mentioned in the sentence, and ensures that the larger context is such that both John and another individual ran.

The next step is to see how this approach deals with the iterated particles. Kobuchi-Philip's (2009) analysis of the real Japanese morpheme *mo* offers a good model. Kobuchi-Philip's insight is that in *John MO Mary MO ran* 'John as well as Mary ran', both MO's can be seen as doing the same thing. The MO in *John MO (ran)* requires for a salient individual other than John to run—Mary's running satisfies it. The MO in *Mary MO (ran)* requires for a salient individual other than Mary to run—John's running satisfies it. The construction as a whole does not

<sup>10</sup> "Suppose we imported the Japanese perspective and assumed that Indo-European indefinites, too, associated with independent quantificational operators. Their distinctive morphology might then tell us something about the nature of those operators. It might indicate syntactic agreement with matching non-overt propositional operators, as proposed in Beghelli and Stowell (1997). That speakers of Latvian, German, or Spanish, for example, perceive the pronouns and determiners of the *kaut-*, *irgendein* or *algun* series as existentials would no longer mean that those expressions are themselves existentials. Their existential look would be the overt expression of syntactic agreement with propositional [E], the true carrier of existential force. Those indefinites might have an uninterpretable but pronounced [E] feature, then, that must enter an agreement relation with a matching interpretable feature that happens to be unpronounced. Japanese indeterminate pronouns, on the other hand, would lack such features, and this would be why they are unselective. The same pronouns can 'associate' with the full range of quantificational operators without producing a feature clash" (Kratzer 2005, p. 124). Kratzer goes on to discuss, among other things, negative, interrogative, and existential concord in German.

impose any presupposition on the context. Similarly for *Person-MO ran* ‘Everyone ran’, with generalized conjunction.

The mutual satisfaction of requirements is reminiscent of the local satisfaction of presuppositions. But presupposition projection works left-to-right, at least when it is effortless (Chemla and Schlenker 2012), so a small amendment is called for. I propose to invoke postsuppositions in the sense of Brasoveanu (2013). That work introduced **postsuppositions** as tests that are delayed and checked simultaneously after the at-issue content is established; the delay is short-term, because it is delimited by the scope of an externally static operator. Let us reclassify the presupposition of MO as a definedness condition whose checking is similarly delayed. This enables the two MOs in *John MO Mary MO ran* to wait for the contributions of each other’s hosts. In contrast, in the case of plain *John MO ran*, the short delay makes no difference: there is nothing in the at-issue content of the sentence to satisfy MO’s requirement. It is therefore imposed on the input context and emerges as a traditional presupposition. For some details, see Brasoveanu and Szabolcsi (2013).

The postsuppositional treatment extends to KA and indeed to any particles that exhibit a similar distribution, irrespective of whether they impose definedness conditions or tests. But, to cut down on the number of novel elements in the proposal, in this paper I will neutrally refer to “requirements”.<sup>11</sup>

## 1.6 The proposal in a nutshell and the plan of the discussion

In (14) I concluded that KA/MO do not perform join/meet operations. Instead, KA and MO impose semantic requirements that are satisfied when their contexts are interpreted as the join/meet of the contributions of their hosts and something else. The behavior of the unary variants is taken to be basic, so the proposal is presented from the perspective of just X-KA/MO.

Consider the constellation in (15), where X-KA/MO occurs in the immediately larger context Y. Y may be sentence-internal, as in (15a, b), or Y may subsume part of the discourse, as in (15c, d). I propose that, from the perspective of KA/MO, the two cases are alike. Each KA/MO is only concerned with its own host X and the context Y, and does not look sideways. If instances of the same particle occur on more than one “junct”, each instance imposes the same requirement on the relation between the interpretation of its host and the context, and the “juncts” satisfy the requirements of each other’s particles.

The surface-syntactic host of KA/MO may be a tensed or untensed clause or a smaller unit. In this paper I pretend that the host X of KA/MO always has the type of propositions (traditional  $t$ , or  $\langle\langle s, t \rangle, t \rangle$  as in Alternative/Inquisitive Semantics). To bring the sentence-internal and the discursal cases under the same umbrella, let us say preliminarily that the immediate context properly contains the host, and both address the same question, or subquestion, under discussion (Roberts 2012). The subquestion option is needed when KA/MO finds itself within the scope of a

<sup>11</sup> Farkas (2002) is a precursor of both the requirement-based (in her terms, constraint-based) semantics and the postsuppositional approach.

quantifier. In (15), the (sub)question may be, “What did he eat (on day  $x$ )?”. The English examples here serve as a mock-up.

(15)	[ <sub>Y</sub> Z(-KA/MO)	<u>X-KA/MO</u> ]
a. Every day	he ate either rice	<u>or [he ate] beans.</u>
b. Every day	he ate both rice	<u>and [he ate] beans.</u>
c.	He ate rice.	<u>Or, he ate beans.</u>
d.	He ate rice.	<u>He ate beans, too.</u>

What kind of requirement should KA/MO impose? Consider:

- (16) a. If  $c$  is the join (least upper bound) of  $a$  and  $b$ , then  $a \leq c$  and  $b \leq c$ .
- b. If  $c$  is the meet (greatest lower bound) of  $a$  and  $b$ , then  $c \leq a$  and  $c \leq b$ .

Since I take  $\llbracket X \rrbracket$  and  $\llbracket Y \rrbracket$  to be propositions,  $\llbracket X \rrbracket \leq \llbracket Y \rrbracket$  means that  $\llbracket X \rrbracket$  entails  $\llbracket Y \rrbracket$ , and  $\llbracket Y \rrbracket \leq \llbracket X \rrbracket$  means that  $\llbracket Y \rrbracket$  entails  $\llbracket X \rrbracket$ . Thus the general format of the requirement a particle imposes can be this:

- (17) My “host proposition” entails/is entailed by an “immediate context proposition”.

Momentarily restricting ourselves to classical, non-inquisitive propositions, the specific requirement of MO (see Sect. 1.5), can be stated as follows:

- (18) MO requires that another proposition parallel to  $\llbracket X \rrbracket$  hold in  $\llbracket Y \rrbracket$ .

MO’s requirement is trivially satisfied if  $\llbracket Y \rrbracket$  is the meet (greatest lower bound) of  $\llbracket X \rrbracket$  and a parallel proposition. “Parallel” is understood in the sense of Asher (1993) and Brasoveanu and Szabolcsi (2013).<sup>12</sup>

Unlike the case of MO, the linguistic literature does not offer a ready-made answer for KA-style particles. I propose the following:<sup>13</sup>

- (19) KA requires that the alternatives in  $\llbracket X \rrbracket$  be preserved and boosted in  $\llbracket Y \rrbracket$ .

<sup>12</sup> In Asher (1993, Chap. 7.5), Parallel and Contrast are structural discourse relations that bear on attaching new constituent SDRSs, truth conditions, anaphora resolution, and so on. The particle *too* signals parallelism. Two constituents are in the Parallel or Contrast relations if there is a bijection from the (modified) embedding tree of the one to that of the other such that the paired nodes have the appropriate polarity. A common theme is among the factors that license common polarity and hence parallelism. See also the discussion of (50) in Sect. 3.1.2.

<sup>13</sup> The Hungarian KA family has one notable member not discussed in this paper, the optional question modifier *vajj/jjon*, literally the 3sg subjunctive form of ‘be.’ *Vajon* is a semantic relative of the question modifiers *-oo* (Kannada), *oare* (Romanian), main-clause *ob* (German), and of epistemic *might* in the declarative domain; see Amritavalli (2003, p. 15), Farkas and Bruce (2010), Gärtner and Gyuris (2012), and Szabolcsi et al. (2014, pp. 128, 138). Direct questions modified by *vajon* can be used to raise issues but not to seek answers; indirect questions modified by *vajon* can only be embedded under predicates like ‘be curious’ or ‘make guesses at’. A preliminary characterization of *vajon* is that it requires alternatives to be preserved, but it does not require them to be boosted; alternatively, that it bears on attentive content. Thus the contribution of *vajon* is closely related, but not identical, to that of *vala/vagy*, which points to further avenues of research.

Preservation means that whatever alternatives  $\llbracket X \rrbracket$  introduces remain alternatives in  $\llbracket Y \rrbracket$ . “Boost” is intended to be a term that does not have a pre-existing definition; the idea is that  $\llbracket Y \rrbracket$  has more alternatives than  $\llbracket X \rrbracket$ , in a sense to be specified in (29). KA’s requirement is trivially satisfied if  $\llbracket Y \rrbracket$  is the join (least upper bound) of  $\llbracket X \rrbracket$  and something else that is not already contained in  $\llbracket X \rrbracket$ . The term “alternative” is meant to evoke Alternative Semantics, although I am going to explicate my proposal using a version of Inquisitive Semantics in Sect. 2.

(18)—(19) can be stated succinctly as follows. Note that the informal construal of both MO and KA assumes  $\llbracket X \rrbracket \neq \llbracket Y \rrbracket$ .

- (20) Let  $X$  be the expression hosting MO/KA, and  $Y$  the immediately larger context.
- a. MO requires  $\llbracket Y \rrbracket < \llbracket X \rrbracket$
  - b. KA requires  $\llbracket X \rrbracket < \llbracket Y \rrbracket$

The proper inclusion requirement is applicable to both classical and inquisitive meanings.

To summarize, on this view, KA and MO are not looking for particular expressions or abstract operators in their environment. They simply check whether a certain kind of semantic relation holds between the interpretation of the host and that of the larger context. They do not care how that relation might have come about. This is key to providing a uniform analysis for cases where “the other junct(s)” may be facts or possibilities in the discourse context and cases where “the other junct(s)” may be sentence-internal. It also allows for a certain flexibility in the grammatical implementation.

The plan of the discussion is as follows.

Section 2 and Sec. 3.2.1 spell out the definitions of “preserve” and “boost” in terms of basic Inquisitive Semantics, as in Ciardelli et al. (2012, 2013), and touches on Hurford’s constraint. It serves as a background for the more linguistic discussion in Sect. 3.

Section 3.1 focuses primarily on coordinations. It introduces two innovations and goes into some detail with various constructions. One of the innovations is to import den Dikken’s (2006) Junction head and to interpret it as Winter’s (1995, 1998) pair-forming operator, in the analysis of both disjunctions and conjunctions. Meet and join, distinct from Junction, are disembodied semantic operations. Another innovation is to attribute some significance to the fact that by default, pairs (tuples) are interpreted as the meet of the members, and expressions whose alternatives originate in indeterminate pronouns are interpreted as the join of the alternatives. The significance of defaults in the present context is that they can be used to predict when MO and KA particles must occur, cross-linguistically. The particles must occur when they serve to override a default interpretation strategy in the given construction. Otherwise their presence is cross-linguistically and language-internally variable, and possibly signals additional semantic content.

Beyond such general considerations, Sect. 3.2.2 discusses indefinites and universal quantifiers, Sect. 3.2.3 polar questions, 3.2.4 approximate numerals, 3.2.5 English *either... or...* in a cross-linguistic context, and 3.3 briefly comments on the morpho-syntax of Junction, MO, and KA. Section 4 concludes.

## 2 Explication in terms of Inquisitive Semantics

### 2.1 A Pocket Inquisitive Toolkit (InqB)

The linguistic insights that unite the signature environments of KA (questions, disjunctions, indefinites) originate with Alternative Semantics. On the other hand, Inquisitive Semantics offers an explicit theory of how the algebraic operations meet, join, and pseudo-complement work, and also offers operators like non-inquisitive closure (!) and non-informative closure (?) that seem to be useful, if not necessary, in dealing with the linguistic phenomena I am concerned with. There is furthermore a difference regarding the analyses of natural linguistic phenomena that has been stressed in the literature, in AnderBois (2012) among others. In Alternative Semantics, alternatives are used in the compositional process, but only in questions do they survive in the final result; they are quantified away in declaratives. In contrast, several, though not all, linguistic applications of Inquisitive Semantics preserve multiple alternatives even in declaratives, in the form of inquisitive or attentive content (more recently, see AnderBois 2012; Coppock and Brochhagen 2013; Roelofsen 2013b; Ciardelli et al. 2014). Classical informative content can be retrieved, but it is not the ultimate result of semantic computation.<sup>14</sup> I explicate the key notions of my proposal using Inquisitive Semantics, with an eye on the worked-out algebraic foundations and the possible survival of alternatives in the semantic output. I use the specific version InqB (B for basic) defined in Ciardelli et al. (2012, 2013) and Roelofsen (2013a), because this version is published and relatively well-known.

I will assume that the reader is familiar with the basic ideas and formalism of Inquisitive Semantics, and merely recap some definitions from InqB, using as small a vocabulary as possible.

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<sup>14</sup> The choice-functional approach to KA in Cable (2010) and Slade (2011) belongs to the Alternative Semantics paradigm. It assumes that interpretation cannot proceed with a set of alternatives; a choice-function is invoked to pick one alternative, and the choice-function will be existentially closed. In addition to the attraction of the Inquisitive Semantic perspective, I am worried by the problems with the choice-functional analysis of indefinites that have been discovered in the last decade; generalizing the analysis further will not help. (For one, Heim (2011) is almost ready to bury that analysis, with reference to Schwarz.) The two versions differ from each other semantically in that Cable (2010) follows Beck (2006) in assuming that *wh*-words (indefinite pronouns) only have a focus-semantic value, and so they crash unless a choice-function imports them into the ordinary-semantic dimension. Slade (2011) has two arguments against the focus-alternatives part. First, according to Rooth (1992), focus alternatives are only constrained by type. In contrast, Slade observes, *wh*-words always have some descriptive content, e.g. +/-human, as in *who* vs. *what*, which now has to be stipulated. Second, following Haida (2007), Slade points out that although *wh*-words are focused in *wh*-questions, they are not focused when they serve as indefinites. Both considerations suggest that the alternatives associated with *wh*-words cannot be identified with focus-induced alternatives. Therefore Slade doesn't follow Cable and Beck in this respect. But he subscribes to the view that quantifiers can only operate on individual variables, not on sets of individuals, and so a choice-function must be invoked.

- (21) A proposition is a non-empty, downward closed set of possibilities.  
 A possibility is a set of worlds.  
 E.g.  $\llbracket \text{Joe dances} \rrbracket = \wp\{w: \text{dance}_w(j)\}$  (powerset for downward closure).  
 An alternative is a maximal possibility.  
 The informative content of  $\phi$ ,  $\text{info}(\phi) = \cup[\phi]$ .  
 Meet:  $A \cap B$ .  
 Join:  $A \cup B$ .  
 Pseudo-complement:  $A^* = \{\beta: \text{disjoint}(\beta, \cup A)\}$ .  
 $A \cap A^* = \perp$ , but  $A \cup A^*$  may or may not be  $\top$  (Heyting-algebra).  
 $\phi$  is informative iff  $\text{info}(\phi) \neq W$ ;  $\phi$  excludes something in  $W$ , the set of all worlds.  
 $\phi$  is inquisitive iff  $\text{info}(\phi) \notin [\phi]$ ;  $\phi$  has more than one maximal possibility.  
 Non-inquisitive closure:  $[\!|\phi|] = ([\phi]^*)^* = \wp(\text{info}(\phi))$ .  
 Non-informative closure:  $[\? \phi] = [\phi] \cup [\phi]^*$ .

The proposition  $\llbracket \text{Kate dances or Mary dances or Joe dances} \rrbracket$  is inquisitive: it has three alternatives (maximal possibilities), the three enclosed sets of worlds below. E.g., the area enclosed in the solid box contains all the worlds in which *Kate dances* is true (1xy).  $\llbracket \text{Kate dances or Mary dances or Joe dances} \rrbracket$  is also informative: it excludes the possibility that not one of them dances (000). Propositions are downward closed sets of possibilities; this can be expressed by using powersets, cf.  $\llbracket \text{Joe dances} \rrbracket = \wp\{w: \text{dance}_w(j)\}$ . Thus  $\llbracket \text{Kate dances or Mary dances or Joe dances} \rrbracket$  is the join of three such powersets,  $\wp\{w: \text{dance}_w(k)\} \cup \wp\{w: \text{dance}_w(m)\} \cup \wp\{w: \text{dance}_w(j)\}$  (Fig. 1).

Regarding the needs of MO, it deserves mention that  $\wp\{w: \text{dance}_w(k)\} \cap \wp\{w: \text{dance}_w(m)\} \cap \wp\{w: \text{dance}_w(j)\}$  interprets  $\llbracket \text{Kate dances and Mary dances and Joe dances} \rrbracket$  correctly as  $\{\{111\}, \emptyset\}$  (see (32)), and would also preserve the alternatives in the conjuncts if they had any (e.g. if they contained indefinites). In contrast, the most straightforward extension of Alternative Semantics to conjunction,  $\{\{w: \text{dance}_w(k)\} \cap \{w: \text{dance}_w(m)\} \cap \{w: \text{dance}_w(j)\}\}$  would incorrectly produce just

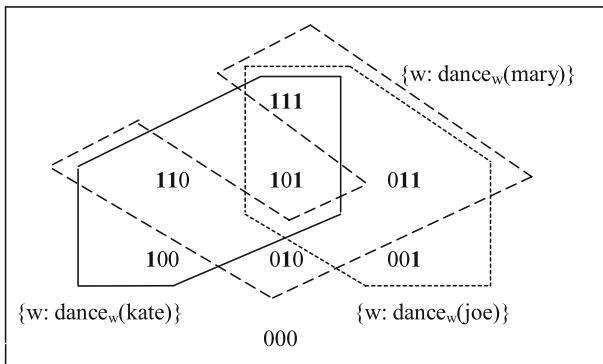


Fig. 1 Three maximal possibilities

$\emptyset$ , since we are intersecting singletons. See Ciardelli and Roelofsen (2014) for discussion.

## 2.2 “Preserve and boost” is one-way inquisitive and informative entailment

Now recall the informal requirement (19), repeated as (22):

(22) KA requires that the alternatives in  $\llbracket X \rrbracket$  be **preserved and boosted** in  $\llbracket Y \rrbracket$ .

Let us write  $\llbracket X \rrbracket < \llbracket Y \rrbracket$  to express the requisite relation. Just like the term “boost”, the symbol “<” is intended to be a fresh one that can be defined to satisfy our needs. The definition of  $\llbracket X \rrbracket < \llbracket Y \rrbracket$  must ensure at least the following things, for some  $\llbracket Z \rrbracket \not\subseteq \llbracket X \rrbracket$ .

- (23) If  $\llbracket Y \rrbracket = \llbracket X \rrbracket \cup \llbracket Z \rrbracket$ , then  $\llbracket X \rrbracket < \llbracket Y \rrbracket$  holds.
- (24) If  $\llbracket Y \rrbracket = \llbracket X \rrbracket \cap \llbracket Z \rrbracket$ , then  $\llbracket X \rrbracket < \llbracket Y \rrbracket$  does not hold.
- (25) If  $\llbracket Y \rrbracket = ((\llbracket X \rrbracket \cup \llbracket Z \rrbracket)^*)^*$ , then  $\llbracket X \rrbracket < \llbracket Y \rrbracket$  holds.
- (26) If  $\llbracket Y \rrbracket = ((\llbracket X \rrbracket)^*)^*$ , then  $\llbracket X \rrbracket < \llbracket Y \rrbracket$  does not hold.

(23)–(26) are empirical claims about the contexts that make KA happy.

(23) says that if KA attaches to X, and  $\llbracket Y \rrbracket$  is obtained by joining  $\llbracket X \rrbracket$  with some distinct  $\llbracket Z \rrbracket$  in an “inquisitive fashion,” then KA’s requirement is satisfied. The desirability of this goes without saying—questions, inquisitive disjunctions and inquisitive indefinites are formed by join.

(24) says that combining  $\llbracket X \rrbracket$  and a distinct  $\llbracket Z \rrbracket$  by meet does not satisfy KA’s requirements. This corresponds to the claim that the presence of KA overrides the default meet interpretation and forces join.

(25) says that KA does not actually demand inquisitiveness. If  $\llbracket X \rrbracket$  and  $\llbracket Z \rrbracket$  are combined using one-fell-swoop non-inquisitive join, KA is still happy. For example, in Hungarian, KA is the stem of the existential verb, and at least that occurrence is likely to have a classical Boolean semantics, i.e. to involve both join and non-inquisitive closure.<sup>15</sup> (25) also allows for other non-inquisitive occurrences of KA.

Based on the above three requirements,  $\llbracket X \rrbracket < \llbracket Y \rrbracket$  looks like  $\llbracket X \rrbracket C \llbracket Y \rrbracket$ , where  $\llbracket \phi \rrbracket$  is the proposition associated with the sentence  $\phi$ ; in other words, the inquisitive content of  $\phi$ . But there is a little difficulty here, cf. (26). Suppose we start out with an expression that is inquisitive. Does simply subjecting it to non-inquisitive closure— $\llbracket !\phi \rrbracket$ , interpreted as  $(\llbracket \phi \rrbracket^*)^*$ , viz.  $\wp(\text{info}(\phi))$ —justify an extra occurrence of the KA morpheme? No such rogue KAs have been reported, to my knowledge. For example, emphatic assertion, i.e. *verum focus*, can be reasonably analyzed as double

<sup>15</sup> *The Historical-Etymological Dictionary of the Hungarian Language* identifies the stems of *vala-* and *vagy* that form indefinite pronouns and disjunctions with the stems of the existential verb:

val-6 ‘be, present participle’  
vagy-ok, vagy, vagy-on/van ‘be, present indicative 1sg, 2sg, 3sg’

negation. That corresponds to its intuitive content and the fact that verum focus eliminates the potential of indefinites and disjunctions in its scope to antecede pronominal or sluicing anaphora. But I am not aware of languages in which the verum focus step justifies attaching an extra KA to the inquisitive expression from the outside:

- (27) a. He did invite [John-KA Mary-KA] (# KA)  
 ‘He **did** invite John or Mary = It isn’t so that he didn’t’  
 b. He did invite [indeterminate-KA] (#KA)  
 ‘He **did** invite someone = It isn’t so that he didn’t’

But the following holds, due to the fact that propositions in InqB are downward closed<sup>16</sup>:

$$(28) \llbracket \phi \rrbracket \subset ((\llbracket \phi \rrbracket)^*)^*$$

This would predict that the non-inquisitive closure (of an initially inquisitive proposition) by itself merits its own KA.

The undesirable situation can be characterized as “endogamy.” There are new possibilities, but they are all joins of old possibilities. Szabolcsi (2013) proposed to exclude endogamy by defining “boost” as requiring that  $\llbracket Y \rrbracket$  contain a possibility that is excluded in  $\llbracket X \rrbracket$ . An elegant alternative, suggested by F. Roelofsens (p.c.), is to add that the informative content of X also be a proper subset of the informative content of Y:

- (29) The desired  $\llbracket X \rrbracket < \llbracket Y \rrbracket$  is one-way inquisitive and informative entailment,  
 $\llbracket X \rrbracket \subset \llbracket Y \rrbracket$  plus  $\text{info}(X) \subset \text{info}(Y)$ .

Notice that if  $Y = !X$ , then their informative contents are by definition identical. Moreover,  $\text{info}(X) \subset \text{info}(Y)$  ensures that  $\llbracket X \rrbracket \subseteq \llbracket Y \rrbracket$  is in fact  $\llbracket X \rrbracket \subset \llbracket Y \rrbracket$ .<sup>17</sup>

Below I demonstrate that definition (29) works well for (23)–(26). Assume a universe with just Mary and Kate.  $mk$  is a world in which both of them run, and  $\{mk\}$  is the corresponding possibility.  $m\bar{k}$  is a world in which Mary runs but Kate does not run, and  $\{m\bar{k}\}$  is the corresponding possibility. And so on. In the examples below I add KA to both disjuncts, but only comment on the well-being of

<sup>16</sup> Observe that  $\llbracket !\phi \rrbracket = \wp(\text{info}(\phi))$ , where  $\text{info}(\phi)$  is obtained by joining all the possibilities in  $\llbracket \phi \rrbracket$ . The powerset of this big flat set contains all the possibilities that the inquisitive version  $\llbracket \phi \rrbracket$  raised, plus we have all the joins of the original maximal possibilities, including the big flat one itself, that were not there before.

<sup>17</sup> Downward closure plus conditionals as material implication give rise to a problem that (29) does not eliminate. Since the conditional is true when the antecedent and the consequent are false, with  $X = \text{Joe dances}$  and  $Y = \text{If Mary sings, Joe dances}$ , both requirements in (29) are satisfied, and so it is predicted that KA can grace the consequent, contrary to fact.

(i) # If Mary sings, [Joe dances]-KA.

Either downward closure or the material implication analysis might be modified, or perhaps under a more precise definition the two expressions do not address the same (sub)question under discussion, cf. (15), and so this choice of X and Y might not qualify for consideration for the particle.



the one attached to *Mary runs*; this suffices for the formal demonstration, since both KAs do the same thing.

In both (30) and (31), we have that  $\llbracket Y \rrbracket$  preserves all the possibilities in  $\llbracket \text{Mary runs} \rrbracket$ , underlined, and has at least one possibility excluded in  $\llbracket \text{Mary runs} \rrbracket$ , e.g.  $\{k \neg m\}$  = only Kate runs. KA is happy.

$$\begin{aligned} (30) \quad \llbracket Y \rrbracket &= \llbracket \text{KA}(\underline{\text{Mary runs}}) \rrbracket \cup \llbracket \text{KA}(\text{Kate runs}) \rrbracket \\ &= \wp\{w: \text{run}_w(m)\} \cup \wp\{w: \text{run}_w(k)\} \\ &= \{\underline{\emptyset}, \underline{\{m \neg k\}}, \underline{\{mk\}}, \underline{\{m \neg k, mk\}}, \{k \neg m\}, \{k \neg m, mk\}\} \end{aligned}$$

$$\begin{aligned} (31) \quad \llbracket Y \rrbracket &= ((\llbracket \text{KA}(\underline{\text{Mary runs}}) \rrbracket \cup \llbracket \text{KA}(\text{Kate runs}) \rrbracket))^* \\ &= \wp\{w: \text{run}_w(m) \vee \text{run}_w(k)\} \\ &= \{\underline{\emptyset}, \underline{\{m \neg k\}}, \underline{\{mk\}}, \underline{\{m \neg k, mk\}}, \\ &\quad \{k \neg m\}, \{k \neg m, mk\}, \{m \neg k, k \neg m\}, \{m \neg k, k \neg m, mk\}\} \end{aligned}$$

Not so in (32) and (33). In (32), the meet operation is performed on the two juncts. Possibilities are shrinking!  $\cap$  eliminates  $\{m \neg k\}$  and  $\{m \neg k, mk\}$  from  $\llbracket \text{Mary runs} \rrbracket$ . KA is unacceptable.

$$\begin{aligned} (32) \quad \llbracket Y \rrbracket &= \llbracket \text{KA}(\underline{\text{Mary runs}}) \rrbracket \cap \llbracket \text{KA}(\text{Kate runs}) \rrbracket \\ &= \wp\{w: \text{run}_w(m)\} \cap \wp\{w: \text{run}_w(k)\} \\ &= \wp\{w: \text{run}_w(m) \wedge \text{run}_w(k)\} \\ &= \{\underline{\emptyset}, \underline{\{m \neg k\}}, \underline{\{mk\}}, \underline{\{m \neg k, mk\}}\} \cap \{\emptyset, \{k \neg m\}, \{mk\}, \{k \neg m, mk\}\} \\ &= \{\underline{\emptyset}, \underline{\{mk\}}\} \end{aligned}$$

In (33), KA attaches to the disjunction from the outside. Non-inquisitive closure/ preserves the possibilities in inquisitive  $\llbracket \text{Mary or Kate runs} \rrbracket$ , underlined, but the new possibilities are all joins of old possibilities: we have endogamy. This is ruled out with reference to  $\text{info}(X) = \text{info}(Y)$ . KA is unacceptable.

$$\begin{aligned} (33) \quad \llbracket Y \rrbracket &= ((\llbracket \text{KA}(\underline{\text{Mary runs or Kate runs}}) \rrbracket))^* \\ &= ((\wp\{w: \text{run}_w(m)\} \cup \wp\{w: \text{run}_w(k)\}))^* \\ &= \{\underline{\emptyset}, \underline{\{m \neg k\}}, \underline{\{mk\}}, \underline{\{m \neg k, mk\}}, \{k \neg m\}, \{k \neg m, mk\}, \\ &\quad \{m \neg k, k \neg m\}, \{m \neg k, k \neg m, mk\}\} \end{aligned}$$

### 2.3 KA's and MO's requirements vis-à-vis Hurford's constraint

As an anonymous reviewer observes, the one-way entailment requirement attributed to KA effectively incorporates Hurford's (1974) constraint:

(34) A disjunction *A or B* is unacceptable if A entails B, or B entails A.

If  $\llbracket A \rrbracket \subseteq \llbracket B \rrbracket$  obtains, then  $\llbracket B \rrbracket \subseteq \llbracket A \rrbracket \cup \llbracket B \rrbracket$  cannot hold.

I take the following examples to illustrate the empirical effect that Hurford observed. The examples are only acceptable if the disjuncts are construed as independent. Construing (35) as 'only Mary, or both Mary and Sue' is fairly easy, as

Chierchia et al. (2012) point out with reference to covert exhaustification. Construing (36) as ‘in Paris or elsewhere in France’ is more difficult, and so (36) is more likely to be perceived as unacceptable than (35).

- (35) John invited Mary, or Mary and Sue.  
 (36) # John vacationed in Paris or in France.

Singh (2008) observes that covert exhaustification in disjunctions is order-sensitive:

- (37) a. John invited Mary, or Mary and Sue.  
       ok ‘only Mary, or both Mary and Sue’  
       b.# John invited Mary and Sue, or Mary.  
           cannot be interpreted as ‘Mary and Sue, or only Mary’  
       c. John invited Mary and Sue, or only Mary.

Here follows a brief overview of the predictions of the present proposal and some results of corpus-based studies.

Given that I do not only attribute a  $[[X]C[Y]]$  requirement to KA, but also a  $[[X]D[Y]]$  requirement to MO, I predict Hurford effects to be equally present in conjunctions. The proposal does not predict a left-to-right asymmetry. I do and must treat the juncts symmetrically, so they can satisfy the requirements of each other’s particles. This is precisely the purpose for which postsuppositions are invoked; but see Brasoveanu and Szabolcsi (2013) for some puzzling ordering effects.

To confront the predictions with English data, one has to be confident about what English constructions, if any, actually fall within the proposal’s empirical scope. The predictions are contingent on whether pairs of KA and MO particles are present, overtly or, if there is linguistic justification for it, covertly. Anticipating some of the discussion in Sect. 3, it is fairly likely that “every *or* is an *either-or*” (Higginbotham 1991), but it is much less likely that every *and* is a *both... and...* Thus disjunctions and *both... and...* constructions that violate the non-inclusion constraint are predicted to be bad, unless of course special interpretations actually eliminate inclusion; but no prediction is made for plain conjunctions, especially when they are not interpreted distributively. Whether or not that is correct, insufficient predictions are made for the unary additive particle *too*:

- (38) a. John left. #John and Mary left, too. (# is predicted)  
       b. John and Mary left. #John left, too. (# is not predicted)

Of course, this problem arises equally in Hungarian, Japanese, etc.

Corpus data paint a more controversial picture than the theoretical semantic literature. Potts (2013) found a multitude of apparent counterexamples to Hurford’s generalization in disjunctions. However, Potts’s study was not designed to address the question whether those counterexamples are interpreted literally, or in some modified sense that makes them compatible with the descriptive generalization.

Levy et al. (2014) report that naturally-occurring examples like (39) are widespread and are interpreted, roughly, as ‘roses and other flowers’:

(39) We sell roses and flowers for Mother’s Day.

The need for the ‘other flowers’ interpretation indicates that no-inclusion effects are also present in conjunctions. However, neither Potts, nor Levy et al. believe that the effects are due to a grammatical constraint. They present analyses in pragmatic terms.

A quick look at  $n$ -gram corpora (Google Web and Google Books), for which I thank R. Levy, confirms that both *or* and *and* are used quite often to coordinate terms that stand in a semantic inclusion relationship with one another. In contrast, apparent inclusion in the presence of overt *either... or...* and *both... and...* is rare to non-existent. But *either... or...* and *both... and...* are scarce in the corpora to begin with, so other methods are needed to investigate whether overt particles indeed make a difference. Interestingly, however, apparent inclusion examples are frequent in both left-to-right and right-to-left orders:

- (40) a. cars and vehicles, vehicles and cars, Paris and France, France and Paris  
 b. cars or vehicles, vehicles or cars, Paris or France, France or Paris

This is surprising, because the rescue strategies that have been proposed in the literature to quietly eliminate inclusion work most naturally in an order-sensitive manner, and indeed Singh claimed order-sensitivity.

For the sake of argument let us hypothesize that the English data pertaining to inclusion cases are replicated for languages that clearly employ KA and MO particles. We may then say that the specific predictions of the present proposal are reasonably supported by corpus data, but do not decide whether communicative pressure or grammar, or perhaps the underlying logic, holds the key. On the other hand, the proposal broadens the scope and raises the stakes of the debate. If it is correct to unify the treatment of quantifiers, connectives, unary particles, and other operators, at least in those languages whose morpho-syntax directly supports the unification, then all those constructions have the potential to present similar inclusion problems. If they do not, that may offer clues about the nature of the phenomenon. If they do, then they will require solutions that extend well beyond the narrow range of constructions that have been studied in connection with English.

### 3 If MO and KA do not perform meet and join, who does?

#### 3.1 Junction, silent meet, and MO

##### 3.1.1 Inspiration: *den Dikken and Winter*

On the present view any semantic action of meeting and joining has to be performed by actors other than MO or KA. Who are they?

My proposal divides the labor traditionally performed by meet and join operators between silent actors and (overt or null) helpers. In doing so it combines insights from Winter (1995, 1998) and den Dikken (2006), with some modifications. These works propose, for independent reasons, that the members of conjunctions and disjunctions are held together, so to speak, by otherwise meaningless elements. In his early work on conjunction, Winter proposed that the word *and* in languages like English and its null counterpart in many other languages like Chinese merely form pairs consisting of the two conjuncts, and the semantic action is performed by a universally silent  $\cap$  operator. In his work on the syntax of the English *either... or...* construction, including the sometimes unexpectedly high and sometimes unexpectedly low syntactic position of *either*, den Dikken (2006) argues that the disjuncts are held together by a null J (Junction) head that projects a Junction Phrase, JP. J is entirely distinct from *either* and from *or*.<sup>18</sup>

Start with Winter (1995, 1998). In the first 7 chapters of his dissertation, Winter presents a thoroughly Boolean approach to conjoined noun phrases which, among other things, derives the collective interpretation of *John and Mary* from generalized quantifier-theoretic  $\lambda P[Pj \wedge Pm]$  via type-shifters. But, in Chapter 8 (based on his 1995 and not included in his 2001 book), Winter says that some problems are not solvable on that view. He proposes that the word *and* is basically a tuple-forming operator. The tuples grow pointwise in the derivation (much like alternatives project in Hamblin/Rooth), and at the desired point a phonetically null intersection (Generalized Conjunction,  $\cap$ ) operator applies to them. That is where *and* appears to take scope, but it is not really *and* itself. Winter assumes that the  $\cap$  operator is always null, and notes that the pair-former is also often phonetically null across languages. This contrasts with disjunctions, which are practically never phonetically null across languages; Winter discusses a few special cases. Here are the pertinent details from Winter (1995, p. 394):

<sup>18</sup> “[T]he present paper’s main innovation is its argument to the effect that both *either* and *or* are phrasal categories. This entails that neither *either* nor *or* is itself a disjunction particle... [T]he surface distribution of *either* is strongly tied to contrastive focus... *Either* will be shown to be immobile (cf. also Han and Romero 2004, *contra* Larson 1985); but *either*’s negative and [+WH] incarnations, *neither* and *whether*, do have the ability or the obligation to move... (*Nor* is not a disjunction particle but a phrasal element that needs to establish a local, feature-checking Agree relationship with the abstract functional head J ...:

(3) <*either*> (...) [<sub>JP</sub> [<sub>XP</sub> (...) <*either*> ...] [ J [<sub>VP</sub> *or* ... ]]]

[T]he approach [extends] to *both... and...*” (den Dikken 2006, pp. 690—691).

Slade (2011) adopts a slight modification of den Dikken’s (3) for the Sinhala ...*hari* ...*hari* and ...*də* ...*də* disjunctions, cf. (8), and briefly extends the same structure to Sinhala ...*-t* ...*-t* conjunctions that are analogous to our (7). Slade always adjoins the first particle outside of JP, which for den Dikken is only one of the options, as can be seen in the quote above.

- (41) a. The logic used to represent natural language sentences includes types with a *product constructor*  $\bullet$ , where an expression of type  $\mathbf{a} \bullet \mathbf{b}$  is a *tuple*  $\langle \varphi_{\mathbf{a}}, \psi_{\mathbf{b}} \rangle$  construed of the expressions  $\varphi_{\mathbf{a}}$ ,  $\psi_{\mathbf{b}}$  of types  $\mathbf{a}$  and  $\mathbf{b}$  by the axiom  $(R_1)$  of *product introduction*.
- b. Interpreting the complex structure using axiom  $(R_1)$ :  
 $[[X_1 \text{ and}/\emptyset X_2]] = [[X_1]] [[\text{and}/\emptyset] [X_2]] = [[X_1]] [X_2] \Rightarrow_{R_1} \langle [[X_1]], [X_2] \rangle$   
 The coordinator *and*, like zero morphology, lacks any denotation.
- c. An optional stage: applying the operator GC:  
 $\cap \langle [[X_1]], [X_2] \rangle \Rightarrow [[X_1]] \cap [X_2]$

I adopt both Winter’s **pair-former** and Winter’s **silent**  $\cap$ , with some modifications. First, the application of  $\cap$  should not be delayed arbitrarily.<sup>19</sup>

Second, Winter does not assign the pair-former to any syntactic category. But den Dikken (2006) and Slade (2011) have argued for the need for an extra player, primarily in disjunctions and by extension in conjunctions. As mentioned above, den Dikken introduced the J(unction) head that projects JP for purely syntactic purposes. I identify Winter’s pair-former with den Dikken’s **Junction**.

The merger of the two theories leaves the word *and* in limbo. Whereas Winter (1995, 1998) analyzes *and* as a pair-former, den Dikken places it in the complement of Junction. He assumes that *or* as well as *and* occur at the left edge of such a complement so as to be able to enter into an Agreement relation with the null Junction head. For Hungarian *és*, I follow Winter; see Sect. 3.1.2. I leave the analysis of English *and* open.

Third, I assume that  $\cap$  is the **default** operation on pairs (tuples): it kicks in even in the absence of a morpho-syntactic exponent. As Winter observed, based on the typological literature, many languages allow phrasal conjunctions without any overt connectives. (Hungarian happens to be one.) Moreover, all languages standardly interpret sequences of sentences, without any overt connectives, as conjunctions.

- (42) It is getting dark. A man is walking in the park. He is whistling.

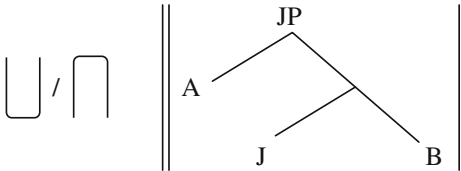
The assumption that  $\cap$  is the default will be critical in my treatment of KA.

Since  $\cap$  is commutative, it does not by itself capture the order-sensitivity of natural language coordinations. One may rely on a grammar whose default evaluation order is left-to-right in general, such as Barker and Shan (2014). Another possibility is to replace commutative  $\cap$  with Dekker’s (2012) non-commutative and non-idempotent version that interprets the second conjunct strictly in the context of the first.

<sup>19</sup> Winter’s motivation for invoking pair-formation plus a silent  $\cap$  that kicks in higher than the position of *and* is that the ‘every man and every woman’ interpretation of *every man and woman* and the treatment of *alternately* and *respectively* do not fall out of the GQ-theoretic treatment. Champollion (2013) offers an extension of Winter’s core theory to interpret Noun-Noun conjunctions. In addition, Champollion points out, letting silent  $\cap$  apply arbitrarily high overgenerates its scope visd-à-vis quantifiers; I assume that  $\cap$  is constrained. This makes the original division of labor at least partially unnecessary. My proposal exploits it for purposes independent of Winter’s.

Based on the fact that cross-linguistically, disjunctions are not unmarked, Winter attributes an entirely different structure to *Kate or Mary* than to *Kate and Mary*. I will propose that they have the same basic structure, with J interpreted as a pair-former, and obtain their divergent interpretations by undergoing a silent meet vs. a silent join operation.

(43)



This structure does not yet include MO or KA particles. Their role is discussed below.

### 3.1.2 The role of MO

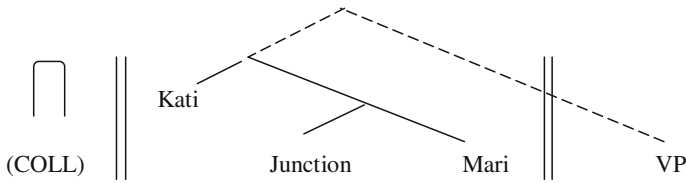
To spell out some concrete examples, we look at Hungarian. First a note about *és*. Hungarian *és* differs from its English dictionary equivalent *and* in several respects. (i) The presence of *és* is optional in both phrasal and clausal conjunctions. (ii) *És* co-occurs with the MO particles *is... is...*; see (45). (iii) Unlike *and*, *és* has no “pair” like *both*, but unlike *is*, *és* cannot be reiterated so as to appear on the first conjunct. It seems straightforward to take *és* to be a Junction head. I do not analyze English *and* in this paper.

In the presence of an appropriate predicate, examples with plain *és* have both distributive and non-distributive readings, much like their English counterparts with plain *and*:

- (44) Kati *és* Mari 100 kilót nyomott. Hungarian  
 Kate and Mary 100 kg weighed  
 ‘Kate and Mary weighed 100 kg’  
 (i) distributive: ‘Kate weighed 100 kg and Mary weighed 100 kg’  
 (ii) non-distributive: ‘Kate and Mary weighed 100 kg together’

According to Winter (1998, 2001), the distributive reading obtains when the intersection of the two generalized quantifiers,  $\lambda P[Pm \wedge Pk]$  applies to  $\llbracket VP \rrbracket$  directly. The result is  $weigh100'(k) \wedge weigh100'(m)$ . The non-distributive reading obtains with the extra step of a collective shift, which picks a minimal element of  $\lambda P[Pm \wedge Pk]$  and lifts the result back into a generalized quantifier,  $\lambda P[P\{k,m\}]$ . (The details of computing this reading are not particularly relevant for present purposes.) Applied to  $\llbracket VP \rrbracket$ , the result is  $weigh100'(\{k,m\})$ , which does not entail  $weigh100'(k)$  or  $weigh100'(m)$ .

(44')



We now turn to MO. The MO particle *is*, like its cross-linguistic relatives Japanese *mo*, Russian *i*, Romanian *și*, etc. appears on each conjunct. (45), which contains reiterated *is* ‘too’ contrasts with (44): the predicate unambiguously distributes to the conjuncts.<sup>20</sup>

- (45) Kati **is** (és) Mari **is** 100 kilót nyomott. Hungarian  
 Kate too=MO and Mary too=MO 100 kg weighed  
 ‘Kate as well as Mary weighed 100 kg’  
 (i) distributive: ‘Kate weighed 100 kg and Mary weighed 100 kg’  
 (ii) # non-distributive: ‘Kate and Mary weighed 100 kg together’

Similarly for *megivott egy üveg bort* ‘drank up a bottle of wine’.

Given distributivity, (46a) with no connective or with *és* is acceptable, cf. (44), but (46b) with *is... is...* is not, cf. (45):

- (46) a. Kati (és) Mari {két jó barát / együtt dolgozik}.  
 Kate and Mary two good friend / together work  
 ‘Kate and Mary {are two good friends / work together}’  
 b. Kati **is** (és) Mari **is** {#két jó barát / #együtt dolgozik}.  
 Kate too and Mary too two good friend / together work  
 #‘Kate as well as Mary {are two good friends / work together}’

There are good reasons to attribute the requirement for the predicate to hold of each individual conjunct to the specific particle *is* ‘too’. (i) The additive particle use of *is* exhibits the same behavior (Szabolcsi 1997, p. 127), and so does English *too*. (47) cannot mean that Mary and another discourse-salient individual constitute a collective that has the property denoted by the predicate. The predicate must hold of Mary by herself.

- (47) Mari is {100 kilót nyomott / megivott egy üveg bort / #két jó barát}.  
 ‘Mary too {weighed 100 kg / drank up a bottle of wine /  
 #is two good friends}’

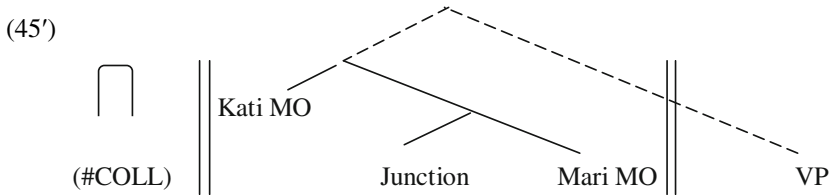
<sup>20</sup> Here and below, note that the predicate distributes to the conjuncts and does not need to distribute to atomic individuals:

(i) Dani és Béni is (és) Mari is 100 kilót nyomott.  
 ‘Danny and Benny (individually/together) weighed 100 kg, and Mary weighed 100 kg’.

(ii) Reiteration of a particle does not by itself force distribution to the individual conjuncts. Japanese *-to* ‘and, lit. with’ supports the same ambiguity as *is*-less Hungarian (44), irrespective of whether *-to* appears on one conjunct or on both:

- (48) A-**to** B(-**to**) de 100 kg ni naru. Japanese  
 ‘A and B weigh 100 kg’  
 (i) distributive: ‘A weighs 100 kg and B weighs 100 kg’  
 (ii) non-distributive: ‘A and B weigh 100 kg together’

The MO-particles *is* in (45) impose postsuppositional requirements. To use the jargon of (17), the host propositions,  $\lambda P[Pk](weigh100')$  and  $\lambda P[Pm](weigh100')$ , must be entailed by the immediate context proposition. If the context proposition is collective  $weigh100'(\{k,m\})$ , it does not entail the host propositions of the MOs (they are independent or, given world knowledge, contradictory). Therefore, one of the interpretations available for (44) is unavailable for (45), because the requirements of the MO particles would not be satisfied.<sup>21</sup>



Framing MO’s requirement in terms of propositions is supported by the fact that Hungarian, Russian, and Japanese are alike in that pronouncing the predicate in each conjunct is not only “logical” but entirely natural and idiomatic. Both versions of the examples in (49) mean ‘Kate as well as Mary laughed’.

- (49) a. Kati is nevetett, Mari is nevetett. = K is, M is nevetett. Hun.  
 Kate too laughed Mary too laughed = K too M too laughed  
 b. I Katja smejalas’, i Masha smejalas’. = I K, i M smejalis’. Rus.  
 too Kate laughed too Mary laughed = too Kate too M laughed  
 c. Keiko-mo warai Mari-mo waratta. = K-mo M-mo waratta. Jap.  
 Keiko-too laugh Mari-too laughed = K-too M-too laughed

In all three languages, MO associates with focus: the particle attaches to a phrase with focus accent. It seems safe to say that the parallel propositions expressed by X-MO and Z-MO are each other’s focus alternatives, with [X] and [Z] logically independent. Hungarian, Russian, and Japanese are also alike in that focus may project to the whole clause. Thus the two parallel propositions need not share a

<sup>21</sup> Mitrović and Sauerland (2014) do not discuss and do not appear to account for the distributivity of *mo* and other particles that they call  $\mu$ -particles.



lexical item, and the focus-accented phrases need not even have the same grammatical function. The interpretation that arises in examples like (50) is that both circumstances obtained, and they were parallel in bearing on the same issue and in being, roughly, both bad or both good.<sup>22</sup>

- (50) a. Context: Why did you return early from your walk?  
 A SZÉL is fújt, a CIPÓMBE is belement egy kavics.  
 the wind too blew, the shoe-my-into too in-went a pebble  
 ‘Both the wind blew and a pebble got in my shoes’
- b. Context: Why did you return early from your walk?  
 I VETER dul, i KAMUSHEK mne v botinok popal.  
 too WIND blew too PEBBLE to.me in shoe got.in  
 ‘Both the wind blew and a pebble got in my shoes’
- c. Context: Why did you move to Italy?  
 kikoo-mo ii-shi musuko-mo sundeiru-kara.  
 climate-too good-as.well.as son- too live-because  
 ‘Because both the climate is nice and my son lives there.’

To summarize, MO inhabits conjunctive contexts, but it need not be held responsible for performing  $\cap$ , which can be independently available in those environments. I proposed that MO’s main contribution is to select and constrain such a context by requiring for its host proposition  $[X]$  to be unidirectionally entailed by an immediate context proposition  $[Y]$ , where  $[X]$  and  $[Y]$  address the same question under discussion. One consequence of this requirement is that  $[Y]$  cannot have a collective interpretation.

It is remarkable that the universal quantifiers that MO particles build also resist collective interpretations. See Lin (1998) for Chinese *dou*, and Szabolcsi et al. (2014) for a comparison of *dou* and Japanese *mo*. Shimoyama (2006, p. 147) suggests that *mo* ‘every/any’ and *mo* ‘too/even’ are distinct, in view of the fact that an intervening *mo* ‘too’ does not block the association of an indeterminate pronoun within a relative clause with *mo* ‘every’ outside the relative clause. Shimoyama does not specify exactly how the two *mo*’s have to be distinct in order not to interfere with each other. But the fact that Hungarian covers the territory of *mo* with two distinct segments, *mind* and *is*, would be consonant with Shimoyama’s suggestion that there is a difference. See (2), repeated as (51):

- (51) a. **mind-en-ki** dare-**mo** ‘everyone/anyone’  
 b. **mind A mind B** A-**mo** B-**mo** ‘A as well as B, both A and B’  
 A **is** (és) B **is** ‘A as well as B, both A and B’  
 c. A **is** A-**mo** ‘A too/even A’

The relation between *mind* and *is* has not been investigated, and I have nothing useful to add here. But, *mind A mind B* is synonymous with *A is (és) B is*. This suggests that, by transitivity, *mind(enki)* and *is* legitimately belong under the same

<sup>22</sup> I thank S. Kasyanenko and M. Kobuchi-Philip for help with the data.

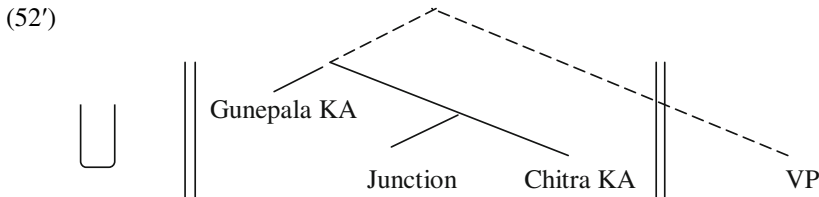
semantic umbrella. The expressions in (51) also occupy the same surface syntactic position in Hungarian (specifier of Dist); see Brody (1990) and Szabolcsi (1997).

### 3.2 Junction, silent join, and KA

#### 3.2.1 KA bleeds default $\cap$ , and forces $\cup$ as an operations on pairs

Based on the fact that cross-linguistically, OR is obligatory in disjunctions, Winter attributes a completely different structure to *Kate or Mary* than to *Kate and Mary*. I propose that they have the same structure, contain the same pair-forming Junction, and differ in  $\cap$  vs.  $\cup$ .<sup>23,24</sup> Just like  $\cap$ ,  $\cup$  is a silent (disembodied) operation.

(52) Gunəpālə **hari** Chitra **hari** gaməṭə giyā. Sinhala  
 G decl.or C decl.or to.the.village went  
 ‘Gunepala or Chitra went to the village’



<sup>23</sup> Slade (2011) adopts Junction to deal with Sinhala alternative questions such as *John-də Mary-də ran?* and declaratives such as *John-hari Mary-hari ran*, where the choice-functional view of *də* and *hari* does not work by itself. I do not adopt his specific use of J, but Slade deserves credit for highlighting the fact that the appearance of KA-particles on all disjuncts is a critical challenge for compositional semantics. Slade interprets J as a fairly heavy lifter, which seems like an artifact of his theory. His J takes three arguments: (i) the second disjunct (Mary), which it turns into the singleton set {Mary}, (ii) the choice function DA/HARI, which will pick the unique element of that singleton, and (iii) the first disjunct (John). In a bit of a Duke-of-York action, J turns *Mary-də/hari* back into a set, then *John* into a singleton set, and finally forms the set {John, Mary}. The choice-function contributed by the *də/hari* that is seemingly attached to the first disjunct but, on Slade’s analysis, is structurally attached to the whole big phrase JP, chooses from this set; the choice-function is existentially closed.

<sup>24</sup> Simons (2005b) already put forth a very interesting extension of Winter (1995, 1998) to disjunctions, in order to account for some of the interactions of *or* with modals and negation that the classical alternative semantics view does not generate. An important ingredient of Simons’s theory is that “a set originally introduced by *or* can be simplified at any point via set union” (Simons 2005b, p. 207), with undesirable readings filtered out by her Symmetry condition. Simons does not say where the simplifying union comes from, but the parallel with Winter’s theory suggests that it is the analog of Winter’s null intersection. I would like to propose that the Boolean union operation that Simons exploits so beautifully is unrelated to the presence of the word *or*—it is nothing but the alternative-flattening of Inquisitive Semantics that retrieves the information content of any proposition, inquisitive or not (see Sect. 2). The non-inquisitive closure operator ! has the “simplify by union” semantics that Simons invokes, and negation has the same flattening effect on its immediate scope. This re-interpretation allows one to replicate Simons’s results within Inquisitive Semantics, without adopting all details of her extension of Winter.—It should be emphasized that Simons (2005b) predates the beginnings of Inquisitive Semantics, and so there is no suggestion that she should have framed her theory in the terms that I am proposing.

Now that we have two silent operations,  $\cap$  and  $\cup$ , how do we know which of them applies in the interpretation of a given construction? The answer rests on the default status of  $\cap$  in the interpretation of pairs, whether they be pairs of phrases, or pairs of sentences forming a text.

(53) *Pairs: default  $\cap$ , KA, and MO*

- a. The presence of KA requires that the alternatives in the host proposition  $\llbracket X \rrbracket$  be preserved and boosted in  $\llbracket Y \rrbracket$ .
- b. The presence of MO requires that the host proposition  $\llbracket X \rrbracket$  and a parallel  $\llbracket Z \rrbracket$  be entailed by  $\llbracket Y \rrbracket$ .
- c. Elsewhere  $\cap$  applies to pairs.

The default status of  $\cap$  makes the presence of an overt indicator necessary if the pair is to avoid undergoing  $\cap$ . KA serves this purpose.<sup>25</sup> KA **bleeds**  $\cap$ , because  $\cap$  would eliminate possibilities in  $\llbracket X \rrbracket$ —in this case, the possibility that only one of Gunepala and Chitra went to the village; see the discussion in Sect. 2.2. KA's requirement is satisfied if the pair undergoes  $\cup$ .

This reasoning accounts for the “no *asynthetic disjunctions*” fact that Winter pointed out based on the typological literature. But we must account for more, since our attention here is not restricted to the connective OR. The ambiguity of the term “disjunction” may blur an important distinction. KA particles generally correlate with “disjunction” qua least upper bound, but only some of those KAs mark “disjunction” as a grammatical connective, corresponding to English *or*.

The crucial observation is that **the only case** in which KA seems cross-linguistically mandated is in **its role as OR**. Consider two other typical roles of KA, marking **indefinite pronouns** and **wh-questions**. In many languages KA is either optional or non-existent in these roles, e.g. in Mandarin Chinese (Cheng 1991; Bhat 2000). Closer to home, in German both of these constructions may go without a dedicated particle. German *was*, an indeterminate pronoun that participates in forming *etwas* and *irgendwas* can serve as an indefinite pronoun or as a question word, unaccompanied by any overt particle. (Cross-linguistically, the two interpretations are disambiguated at least by the fact that indefinites are unstressed and question words are stressed.) In contrast, KA as the connective OR is not optional, see (56):

(54) zheli que-le **shenme**. Mandarin

- i. ‘There is **something** missing here’
- ii. ‘**What** is missing here?’

(55) Wer mag **was**? German

- i. ‘Who likes **something**?’
- ii. ‘Who likes **what**?’

<sup>25</sup> Some other overt element can also serve this purpose; the claim here is that KA certainly does.

- (56) Hänsel Gretel Mandarin, German  
 # ‘Hänsel or Gretel’

The explanation for the contrast must be that interpretation in the presence of indeterminate pronouns has a different default than interpretation in the presence of pairs (tuples) of explicitly listed alternatives. In the case of indeterminate pronouns, the  $\cup$  interpretation arises even without KA’s help; in the case of pairs, it does not.

### 3.2.2 Indeterminate pronouns and default $\cup$ , counteracted by MO

We have a puzzling situation. Disjunctions, indefinites, questions, and other lesser-known constructions form a natural class: they present multiple live alternatives. Since KA particles occur in all of these constructions and, apart from some intriguing cases (Zimmermann 2009) only in these, KA must have to do with their common trait. But we see that KA can be absent from many of these constructions! So having that trait is definitely not contingent on the presence of KA (unless we assume a multitude of null KAs). The “have your cake and eat it” solution to the puzzle that I propose is as follows:

- (57) *Indeterminate pronouns and KA*
- a. If join semantics arises without KA’s ministrations, then KA can be absent from the construction.
  - b. If KA particles are nevertheless present in such cases, then either
    - (i) they are more or less redundant, but legitimate because their  $[[X] < [Y]]$  requirement is satisfied; or
    - (ii) they compose with further semantic actors, in addition to imposing their  $[[X] < [Y]]$  requirement.

Beyond the common trait of presenting sets of multiple alternatives, expressions like *Someone dances* and *Who dances?* diverge. They diverge in being declaratives vs. interrogatives, and furthermore in that indefinites may be specific, non-specific, epistemic, free-choice, and so on, whereas wh-questions may be exhaustive to various degrees, may or may not carry an existential presupposition, and so on. I assume that the further semantic actors hinted at in (57bii) have to do with these ingredients of their meanings.

Here I am primarily concerned with (57a) and (57bi) for indefinites and wh-questions; I take up polar questions and approximate numerals in the subsequent sections. How KA composes with further semantic actors, i.e. (57bii) must be left for further research.<sup>26</sup>

In Kratzer and Shimoyama (2002) and Shimoyama (2006, pp. 153–154) the join interpretation of sentences with indefinites and of wh-questions is an automatic product of the Hamblinian alternative-generator analysis of indeterminate pronouns in combination with pointwise functional application. The person indeterminate

<sup>26</sup> See, among others, Haspelmath (1997), Bhat (2000), Farkas (2002), Gärtner (2009), Lin (2014), Alonso-Ovalle and Menéndez-Benito (to app).

pronoun in Japanese is *dare*. The common core of *Dare-ga odorimasu ka?* ‘Who dances?’ and *Dare-ka-ga odorimasu* ‘Someone dances’ is the same set of propositions that corresponds to *Kate or Mary or Joe dances* in a universe with just these three persons, cf. (5a).

$$(58) \text{ Who dances?, Someone dances, Kate or Mary or Joe dances} \\ \{\{w: \text{dance}_w(k)\}, \{w: \text{dance}_w(m)\}, \{w: \text{dance}_w(j)\}\} \\ = \{\{w: \text{dance}_w(k)\}\} \cup \{\{w: \text{dance}_w(m)\}\} \cup \{\{w: \text{dance}_w(j)\}\}$$

$$(59) \text{ For all possible worlds } w \text{ and variable assignments } g, \\ \text{a. } \llbracket \text{dare-} \rrbracket^{w,g} = \{x \in D_e: \text{person}(x)(w)\} \\ \text{b. } \llbracket \text{odorimasu} \rrbracket^{w,g} = \{\lambda x \lambda w' [\text{dance}(x)(w')]\} \\ \text{c. If } \alpha \text{ is a branching node with daughters } \beta \text{ and } \gamma, \text{ and } \llbracket \beta \rrbracket^{w,g} \subseteq D_{\langle \sigma, \tau \rangle} \text{ and } \\ \llbracket \gamma \rrbracket^{w,g} \subseteq D_\sigma, \text{ then } \llbracket \alpha \rrbracket^{w,g} = \{f(x) \in D_\tau: f \in \llbracket \beta \rrbracket^{w,g} \text{ and } x \in \llbracket \gamma \rrbracket^{w,g}\}. \\ \text{d. } \llbracket \text{dare- odorimasu} \rrbracket^{w,g} = \{f(x) \in D_\tau: f \in \llbracket \text{odorimasu} \rrbracket^{w,g} \text{ and } x \in \llbracket \text{dare} \rrbracket^{w,g}\} \\ = \{\lambda w' [\text{dance}(x)(w')]: \text{person}(x)(w)\}$$

Presenting this result, Shimoyama (2006, p. 154) observes, “Note that the semantic contribution of the question particle *ka* may now be seen as a rather trivial one.” The same would hold for the *ka* of indefinites (*dare-ka*).

The compositional semantic implementation of Inquisitive Semantics in Ciardelli and Roelofsen (2013a) replicates the same result without interpreting indeterminate pronouns as alternative-generators and without pointwise functional application. In this fragment, denoting sets of alternatives is confined to the propositional level. Instances of the classical type *t* are replaced by  $\langle\langle s, t \rangle, t \rangle$ . The derivation in (62) proceeds with plain functional application.

$$(60) \text{ Notation: The downward closure of } S, S^\downarrow := \{p : p \subseteq q \text{ for some } q \in S\}$$

$$(61) \text{ If the persons are Kate, Mary, and Joe, then} \\ \{\{w: \text{dance}_w(x)\}: x \in D_e\}^\downarrow \\ = \emptyset \{w: \text{dance}_w(k)\} \cup \emptyset \{w: \text{dance}_w(m)\} \cup \emptyset \{w: \text{dance}_w(j)\}$$

$$(62) \text{ a. } \llbracket \text{who} \rrbracket = \llbracket \text{someone} \rrbracket = \lambda P_{\langle e, \langle\langle s, t \rangle, t \rangle \rangle}. \cup x \in D_e P(x) \\ \text{b. } \llbracket \text{dance} \rrbracket = \lambda x_e. \text{dance}_{\langle e, \langle\langle s, t \rangle, t \rangle \rangle}(x) = \lambda x_e. \{\{w: x \text{ dances in } w\}\}^\downarrow \\ \text{c. } \llbracket \text{who/someone} \rrbracket(\llbracket \text{dance} \rrbracket) = \cup x \in D_e \text{dance}(x) \\ = \{\{w: x \text{ dances in } w\}: x \in D_e\}^\downarrow$$

Both Kratzer and Shimoyama’s and Ciardelli and Roelofsen’s grammars automatically interpret the common core of *Who dances?* and *Someone dances* as the generalized join of a set of propositions such that, for every person in the universe, there is a corresponding proposition in that set. We may say that the join interpretation arises by default, although there is no  $\cup$  step in the derivation. Join is grounded in the interpretations of indeterminate pronouns and in the general composition rules. Thus, the desired result obtains without KA being there to impose its requirements, cf. (57a).

Could KAs be present—would the  $[[X]] < [[Y]]$  requirement be satisfied? The question is what counts as KA's host proposition in the presence of an indeterminate pronoun and a single pertinent KA. Let us take KA's host proposition to be, for each individual that the indeterminate pronoun ranges over, the proposition that corresponds to that individual. Under this construal KA's requirement is satisfied; cf. (58) and (61). Therefore KA's presence would be legitimate, either redundantly, as envisaged in (57bi), or as a component of a unit that carries further semantic content or imposes further semantic constraints, as envisaged in (57bii).

By the same reasoning that was used in the case of coordinations, in this constellation the **meet** operation of **universal** pronouns needs to be triggered by some overt indicator. In various languages it is the MO particle itself that serves in this role; see Jayaseelan (2001) for Malayalam *-um*, Slade (2011) for Sinhala *-t*, and Kobuchi-Philip (2009) for Japanese *-mo*. As was noted in Sect. 3.1, Shimoyama (2006, p. 147) raises doubts regarding the identity of *-mo* as an additive particle and as a component of *dare-mo* 'everyone/anyone', and Hungarian covers the territory of *-mo* with two distinct items. Whether the pertinent item is one that has the full distribution of MO is not critical. The critical prediction is this:

(63) *Two tracks for  $\cap$  versus  $\cup$*

The interpretation of pairs yields a  $\cap$  semantics by default, therefore KA (or some other indicator) is necessary to avoid  $\cap$  and obtain  $\cup$ . The interpretation of expressions with indeterminate pronouns yields a  $\cup$  semantics by default, therefore MO (or some other indicator) is necessary to avoid  $\cup$  and obtain  $\cap$  for universals. If the choice is MO, it will contribute "distribution to the conjuncts" to the interpretation of the universal it builds.

The prediction seems correct; to my knowledge, bare indeterminate pronouns do not receive universally quantified interpretations, cross-linguistically.<sup>27</sup>

- (64) a. ok bare indeterminate pronoun 'indefinite or interrogative'  
 b. # bare indeterminate pronoun 'universal'

In coordinations (structures involving pairs) the only truth-conditional difference MO makes is to force the distribution of the predicate to each conjunct, excluding collective readings. The reason is that  $\cap$  applies to pairs anyway. In the context of indeterminate pronouns, however, MO's requirements also serve to invoke  $\cap$ .

Shimoyama (2006, p. 155) defines a Hamblin semantic interpretation of the universal quantifier particle *mo* syncategorematically as follows:

(65) For  $[[\alpha]]^g \subseteq D_e$ ,  $[[\alpha \text{ mo}]]^g = \{\lambda P \forall x [x \in [[\alpha]]^g \rightarrow P(x)]\}$

<sup>27</sup> Free relatives contain relative pronouns, and so I do not take them to be immediate counterexamples.

In Inquisitive Semantics, the universal can be obtained by generalized  $\cap$ , thanks to downward closure:<sup>28</sup>

- (66) If the persons are Kate, Mary, and Joe, then
 
$$\cap\{\{w: \text{dance}_w(x)\}: x \in D_e\}^\downarrow$$

$$= \wp\{w: \text{dance}_w(k)\} \cap \wp\{w: \text{dance}_w(m)\} \cap \wp\{w: \text{dance}_w(j)\}$$
- (67) a.  $\llbracket \text{everyone} \rrbracket = \lambda P_{\langle e, \langle \langle s, t \rangle, t \rangle \rangle}. \cap x \in D_e P(x)$   
 b.  $\llbracket \text{dance} \rrbracket = \lambda x_e. \text{dance}_{\langle e, \langle \langle s, t \rangle, t \rangle \rangle}(x)$   
 c.  $\llbracket \text{everyone} \rrbracket(\llbracket \text{dance} \rrbracket) = \cap x \in D_e \text{dance}(x)$   

$$= \cap\{\{w: \text{dances}(x)(w)\}: x \in D_e\}^\downarrow$$

### 3.2.3 Polarity questions and alternative questions

**Polar questions** deserve special attention in the context of the present theory. Sometimes they are segmentally unmarked, at other times they carry KA-particles. This section extends the above reasoning to explain why that is possible.

It will be useful to emphasize that not all question particles (i.e. particles whose characteristic habitat is in main-clausal or complement interrogatives) need to be KA-particles in our sense. The formation of a set of multiple alternatives is just one step in the derivation of questions: a step that is shared by the derivation of declaratives involving disjunctions and indefinites. According Ciardelli et al. (2012, 2013) and AnderBois (2012), questions are distinguished from declaratives, including inquisitive ones, by the fact that the alternatives fully cover the logical space. This literature introduces two ? operators, open non-informative closure ?<sub>o</sub> and presuppositional, closed non-informative closure ?<sub>c</sub> to achieve that effect. If a particle were found to correspond to ?<sub>o</sub> or ?<sub>c</sub>, it would be a question particle, but not a KA-particle.

Investigating main clauses, Krifka (2001) distinguishes two types of polar questions: polarity questions, which may be answered by plain *Yes* or *No*, and alternative questions, which require repeating an alternative, possibly accompanied by *Yes* or *No*. Krifka differs from Karttunen (1977), who considers polarity questions a subclass of alternative questions. Based on Hungarian data, I will argue that polarity questions are formed directly with the ? operator of Inquisitive Semantics, whereas alternative questions are built as disjunctions. While the resulting semantics is basically the same in the two cases, they differ in that only in the latter case is KA needed to bleed default  $\cap$ .

<sup>28</sup> Keenan and Faltz’s (1985) generalized quantifier theoretic insight is that ‘someone’ is the join, and ‘everyone’ is the meet of the “Montagovian individuals”, i.e. the sets of properties associated with the first-order individuals in the universe. To replicate this directly, the indeterminate pronoun base (Japanese *dare*, Hungarian *ki*, Sinhala *kau*, etc. for persons) could be identified with  $\lambda P. \{\wp\{w: P_w(x)\} : x \in D_e\}$ , obtaining ‘someone’ (*dare-ka*, *vala-ki*, *kau-dā*) and ‘everyone’ (*dare-mo*, *minden-ki*, *kau-t*) by applying generalized  $\cup$  and  $\cap$ , respectively. On this account,  $\cup$  would be an actual default operation in the presence of indeterminate pronouns, to be bled by a MO particle; the exact mirror image of the scenario described in connection with pairs.

Specifically, I argue that (68a) is a polarity question, whereas (68b, c, d) and (69b, c, d) involve alternative questions, i.e. disjunctions.<sup>29</sup>

In (68a), the up-arrow  $\uparrow$  indicates final rising intonation, and the down-arrow  $\downarrow$  falling, declarative intonation; no intonational distinction exists in complement interrogatives. *Hogy* is the invariant subordinating complementizer. Note the *-e* suffix in (c)–(d), which I analyze as a KA-particle.<sup>30</sup>

(68) Main clause question

- |  |                             |
|--|-----------------------------|
| a. Táncolt Mari? $\uparrow$                      | ‘Did Mary dance?’           |
| b. Táncolt Mari vagy nem? $\downarrow$           | ‘Did Mary dance or not?’    |
| c. Táncolt- <b>e</b> Mari? $\downarrow$          | ‘Did Mary dance-KA?’        |
| d. Táncolt- <b>e</b> Mari vagy nem? $\downarrow$ | ‘Did Mary dance-KA or not?’ |

(69) Interrogative complement

- |  |   |
|--|---|
| a. *... hogy táncolt Mari.                   | ‘... lit. that Mary danced’                         |
| b. ... hogy táncolt Mari vagy nem.           | ‘... that Mary danced or not<br>= whether M danced’ |
| c. ... hogy táncolt- <b>e</b> Mari.          | ‘... whether Mary danced-KA’                        |
| d. ... hogy táncolt- <b>e</b> Mari vagy nem. | ‘... whether Mary danced-KA or not’                 |

Main clausal (68a), which has just final rising intonation  $\uparrow$ , is the most common way of asking a yes/no question. (68a) can be readily answered in any of the following ways (Hungarian is a language with V-stranding VP-ellipsis):

- |                               |                          |
|-------------------------------|--------------------------|
| (70) Táncolt Mari? $\uparrow$ | ‘Did Mary dance?’ (=68a) |
| Igen.                         | ‘Yes’                    |
| gesture: nod of the head      |                          |
| Táncolt.                      | ‘She danced’             |
| Igen, táncolt.                | ‘Yes, she danced’        |

Such a segmentally unmarked interrogative is sharply ungrammatical as a complement; see (69a).

I propose that *Táncolt Mari* $\uparrow$  is a Krifkean **polarity question**, and that polarity questions are a main-clause phenomenon, interpreted via the Inquisitive Semantic ? operator (open, i.e. non-presuppositional non-informative closure, see (21)).

[? $\phi$ ] is defined as [ $\phi$ ] $\cup$ [ $\phi$ ]\*, where [ $\phi$ ]\* is the (pseudo-)complement of [ $\phi$ ]. Therefore, (68a) is **logically equivalent to a disjunction, but compositionally speaking it is not one**. No pair is formed with a default  $\cap$  interpretation. A KA particle is only needed when the desired  $\cup$  interpretation would not arise otherwise.

<sup>29</sup> The Russian patterns are very similar to (68)–(69); the data presented in (13) correspond to (68–69b, c, d). Some descriptive differences between Russian *li* and Hungarian *-e* are as follows. (i) *Tancevala li Masha?*, the counterpart of (68c), may have a rising intonation; (ii) *li*, but not *-e*, also attaches to nominal foci in questions that contain a finite verb; (iii) *li*, but not *-e*, can serve as a question modifier indicating puzzlement, not unlike *vajon*, cf. note 13. I thank M. Esipova, M. Gouskova, and S. Kasyanenko for discussion.

<sup>30</sup> The particle *-e* attaches to the finite verb. In the absence of one (in the case of ellipsis or a null copula) it attaches to the focus or the predicate nominal that would precede the finite verb.



This is not the case here, so ? $\varphi$  can go without KA. In this respect (68a) is similar to German (55), where bare, KA-less indeterminate pronouns serve as indefinites and question words.

- (71) a. Táncolt Mari?↑ ‘Did Mary dance?’ (=68a)  
 b. Wer mag was? ‘Who likes something/what?’ (=55)

Rising intonation in the main clause alternates with ‘or not’ (68b) and with the suffix *-e* (68c). Moreover, the latter two, ‘or not’ and *-e*, also co-occur (68d). The same three options exist in complement clauses, see (69b, c, d). I argue that they are all alternative questions, i.e., disjunctions. In fact, the same patterns occur in classical alternative questions, as below (only main-clause versions given). Here ‘coffee’ plays the role of ‘not tea’, and the closed ?<sub>c</sub> operator carries the presupposition that one of the alternatives is true and the alternatives together are exhaustive.<sup>31</sup>

- (72) a. TEÁT akar?↑  
 b. TEÁT vagy KÁVÉT akar?↓  
 c. TEÁT akar-e?↓  
 d. TEÁT akar-e vagy KÁVÉT(\*-e)?↓  
 ‘Is it TEA OR {COFFEE / the OTHER option} that he wants?’ (a)—(d)

Neither (68b)/(72b), nor (68d)/(72d) can be answered with ‘Yes’ or with a nod. They are clearly alternative questions that require repeating (the elliptical version of) the chosen alternative. Interestingly, (68c)/(72c) with particle *-e* follows the same pattern as a preference. The strength of the preference varies with speakers, possibly with regional dialects; for many speakers the plain ‘Yes’ or nod response to the *-e* question (68c)/(72c) is quite unnatural. Furthermore, the three main-clause questions (68b, c, d)/(72b, c, d) are alike in exhibiting a “cornering effect” that Biezma and Rawlins (2012) ascribe to *or not* questions in English. These facts suggest that (68c)/(72c) are probably **alternative questions** that require the logical reconstruction of the second alternative. I analyze *-e* as a KA-particle, although it is etymologically unrelated to *vala*/*vagy*.

We may note that no cornering effect is present in complement questions with (69b, c, d). For example, (73) is entirely natural. The same seems true of English *whether or not* interrogative complements, in contrast to main-clausal *or not* questions. This indicates that the cornering effect that exists only in main clauses is a discourse-pragmatic one.

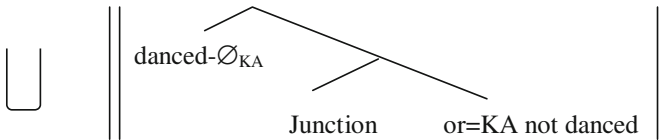
- (73) Kíváncsi vagyok, hogy { táncolt vagy nem / táncolt-e / táncolt-e vagy nem }.  
 ‘I am curious whether she danced or not’

Let us turn to the analysis of (68b, c, d) and (69b, c, d). Alternative questions, being true disjunctions, must contain either one KA (*-e* or *vagy*) or two (*-e* and *vagy*). The KA-particle *-e* requires, as usual, that the contribution of its host be

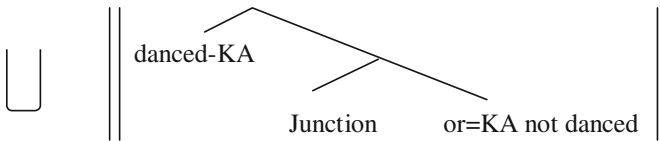
<sup>31</sup> These analyses converge with AnderBois (2012) on Yucatec Maya alternative questions and with Roelofsens and Farkas (2014) on open and closed interrogatives.

preserved and boosted in the immediately larger context. In (68b, d)—(69b, d), both alternatives are spelled out<sup>32</sup>:

(74) Cf. (68b), (69b), and Russian (13b)



(75) Cf. (68d), (69d), and Russian (13c)



In (68c)–(69c), the proposition ‘He did not dance’ is recovered as the only possible exclusive alternative. I do not attribute a JP structure to (76), because that would commit to the syntactic presence of the recovered content, which I wish to remain neutral about.

(76) Cf. (68c), (69c), and Russian (13a)

$[[\text{He danced KA}]] \cup \varnothing\{\text{w: he did not dance}\}$

This account has the advantage that it does not make overt *vagy nem* ‘or not’ a meaningless flourish, which is essentially what Karttunen’s (1977) analysis does. The fact that (68b)–(69b) with *vagy nem* and (68c)–(69c) with *-e* are equivalent

<sup>32</sup> Japanese *kadooka*, lit. ‘or-how-or’, which the literature treats as a single sentence-final particle, probably forms disjunctions of the type (75). In main clauses *ka* requires a politeness marker, so (i) gives way to (ii), which is rare but possible. I thank M. Kobuchi-Philip for discussion.

- (i) *watashi-wa* [John-ga konban party-ni iku-ka doo-ka] shira-nai.  
I-top John-nom tonight party-to go-ka how-ka know-not  
‘I don’t know whether John is going to the party tonight or not.’
- (ii) *John-wa* konban party-ni ikimasu-ka? doo-desu-ka?  
John-top tonight party-to go.polite-ka how-copula.polite-ka  
‘Is John going to the party tonight? How would it be?’

indicates that both *vagy nem* and *-e* need to be taken seriously, and their co-occurrence must be analyzed in a way that is compatible with that. Notice that this is the key problem that this paper aims to account for.

In sum, the form of polar questions are compatible with the claim that disjunctions and only disjunctions require a KA-style particle cross-linguistically, mandated by the need to override silent  $\cap$ , the default operator on pairs. The fact that polarity questions in the sense of Krifka (2001) only have a rising final intonation in Hungarian, Russian, and other languages need not be seen as a counterexample to the generalization, nor immediately force us to qualify rising intonation as an instance of KA.

### 3.2.4 More of unary KA: approximate numerals and “open lists”

(76) represents unary KA in the domain of questions. The alternative that satisfies the boosting requirement is semantically recovered as the only exclusive alternative to the content of KA’s host. Are there other dedicated unary versions of KA?

The Hungarian “approximate numeral” construction in (11), repeated below with glosses as (77), is another instance of unary KA:

- (77) János vett **vagy** száz könyvet.  
 John bought or 100 book  
 ‘John bought some 100 books’

*Vagy száz* is literally ‘or 100’. I take it that the disjunction is ‘100 or another number in the vicinity of 100’. It is difficult to say whether *vagy száz* amounts to ‘at least 100’ or ‘around 100, possibly a little less’ or maybe it is ambiguous. What range of interpretations we predict depends on whether *száz* means ‘at least 100’ or ‘exactly 100’. The numeral need not be a big round number: *vagy 23* ‘at least/around 23’ is perfectly possible.

It is worth pointing out that the syntactic distribution of *vagy 100* is identical to that of regular numerals; it is not a limited construction.<sup>33</sup> But it is special in that *vagy X* only works with numerals, so this version of *vagy* ‘or’ is lexicalized to operate on alternatives drawn from some contextually relevant halo of the numeral. The Japanese particle *toka*, which does not seem to have been discussed in the linguistic literature other than Szabolcsi et al. (2014), replicates the behavior of *vagy* with numerals, but it has a much wider distribution (Kobuchi-Philip, p.c.).

<sup>33</sup> In these respects it differs from the Dutch *of* ‘or’ + numeral construction (N. Corver, p.c.):

- (i) Dit varken weegt [een kilo of 50]  
 this pig weighs a kilo or 50  
 ‘This pig weighs approximately 50 kilos’  
 (ii) Zij bereikten het dorp na [een dag of 10]  
 they reached the village after a day or 10  
 ‘They reached the village after approximately 10 days’  
 (iii) Hoe lang is de weg? — \*Of zes kilometer.  
 how long is the road — or six km  
 intended ‘About 6 km’

In addition to (1c), repeated as (78), *toka* appears to form “open list disjunctions” in the sense of Roelofsen and Farkas (2014). It is remarkable that the answers in (79) are appropriate even if the only individuals who came to the party were the ones mentioned. They are mention-some answers in that they withhold exhaustivity, rather than necessarily giving partial information. Likewise (80) is appropriate if Mary’s family member is indeed sick, but the speaker does not want to make a clear statement.

(78) *hyaku-nin-toka*  
100-classifier-TOKA  
‘at least/about 100’

(79) Context: Who came to the party?  
a. John-**toka**-ga party-ni kita.  
John-TOKA-nom party-to came  
‘For example John came—I don’t want to be specific’  
b. [John-**toka** Mary-**toka**] -ga party-ni kita.  
John-TOKA Mary-TOKA-nom party-to came  
‘John, Mary, ...’

(80) *Mary-wa kazoku-ga byooki-toka-de komatteiru-sooda*  
Mary-top family.member-nom sick-TOKA-by in.trouble-I.hear/it.seems  
‘Mary’s family member is sick or something’

It seems, therefore, that the non-existence of *vagy Mari* ‘for example Mari’ in Hungarian is more of an accidental than a principled gap.

### 3.2.5 *Either... or...*<sup>34</sup>

Hungarian, Russian, French, and other unrelated languages exhibit two different disjunction constructions. One has ‘or’ preceding the non-initial disjuncts, typically the last one, as in (80). The other has ‘or’ preceding each disjunct, as in (81). For ease of reference, I dub (80) “plain disjunctions” and (81) “exhaustive disjunctions”.

(80) Plain disjunctions  
a. Kati (*vagy*) Mari *vagy* Juli  
b. Katja (*ili*) Masha *ili* Iulija  
c. Catherine (*ou*) Marie *ou* Julie  
} ‘K (or) M or J’

(81) Exhaustive disjunctions  
a. *vagy* Kati *vagy* Mari *vagy* Juli  
b. *ili* Katja *ili* Masha *ili* Iulija  
c. *ou* Catherine *ou* Marie *ou* Julie  
} ‘only K, or only M, or only J’

<sup>34</sup> The discussion in this section was prompted by an anonymous reviewer’s request for comments on English. *Both... and...* must be left for another occasion. On some aspects of English *and* and *or*, see Zhang (2014).

As noted in Sect. 1.3, the Sinhala and Malayalam iterated KA examples that are in the center of this paper are not of the exhaustive sort; their meanings are as inclusive as that of plain English ‘or’.

- (82) a. Gunəpālə **hari** Chitra **hari** gaməṭə giyā. Sinhala  
 G or C or to.village went  
 ‘G or C went to the village’ (Slade 2011, Chap. 2, (26))
- b. Mary John-ine-(y)**oo** Bill-ine-(y)**oo** cumbiccu. Malayalam  
 Mary John-acc-or Bill-acc-or kissed  
 ‘Mary kissed John or Bill’ (Jayaseelan 2008: (2))

As Amritavalli (2003) discusses in detail, Kannada has both kinds of fully-iterated particle constructions. (83), with *meals-oo snacks-oo*, appears to be comparable to Malayalam (82b). (84), with *illa meals, illa snacks*, appears to be comparable to Hungarian/Russian/French exhaustive disjunctions in (81).

- (83) ii hotel-nalli uuTa-noo tinDi-noo yeenaadru sigutte. Kannada  
 this hotel-LOC meals oo snacks oo anything will-find  
 ‘At this hotel meals or snacks or such things are available.’  
 (Amritavalli 2003: (17a))
- (84) ii hotel-nalli illa uuTa illa tinDi (\*yeenaadru) sigutte. Kannada  
 this hotel-LOC NEG meals NEG snacks anything will-find  
 ‘At this hotel, if meals are not available, then snacks are available.’  
 (Amritavalli 2003: (17b))

Spector (2014) offers a detailed discussion of French reiterated *soit... soit...* (he notates it as *soit\_soit*, which I will follow). It appears that his generalizations hold for Hungarian *vagy\_vagy*, Russian *ili\_ili*, French *ou\_ou* in (81) and for Kannada *illa\_illa* in (84).

- (85) Spector (2014, pp. 13—17) on *soit\_soit*:
- Soit\_soit* obligatorily triggers the scalar inferences which are normally optionally triggered by disjunction. This generalization captures the strong tendency for the exclusive reading in a non-embedded context, together with the fact that when *soit\_soit* is in the scope of a universal quantifier, the inferences corresponding to the exclusive reading are no longer obligatorily present.
  - Soit\_soit* is felicitous only if it is under the scope of an exhaustivity operator  $\llbracket\text{exh}\rrbracket$  or gives rise to a scalar implicated presupposition.
  - Together with an appropriately formulated Economy Condition on  $\llbracket\text{exh}\rrbracket$ , this makes *soit\_soit* a global positive polarity item, i.e. prevents it from occurring in a decreasing context.

Spector compares *soit\_soit* with non-reiterated *ou* but not with *ou\_ou*, and he does not analyze English *either... or...* I propose that English *either... or...* serves as a counterpart of both kinds of fully-iterated particle constructions, the plain and

the exhaustive kinds.<sup>35</sup> Interaction with negation, i.e. the non-local PPI property will be used as a diagnostic.

One part of the claim is fairly straightforward. Sometimes the presence or absence of *either* does not make a difference, the constructions have de Morganic meanings. Such are (86a, b): ‘I don’t think that John ate rice and I don’t think that John ate beans.’ (Underlining highlights the words *either* and *or*; and does not indicate prosodic prominence.)

- (86) a. I don’t think that John ate rice or beans.  
 b. I don’t think that John ate either rice or beans.

This is already an important conclusion. The efforts directed at Sinhala and Malayalam disjunctions with plain KA particles on each junct turn out to be relevant to English.

Rather than investigating under what circumstances the same strings in (86) may lack de Morganic readings (a huge descriptive task that definitely goes beyond the scope of this paper), I point out that the presence of *either* seems to make a systematic difference when it is attached to TP. Consider:

- (87) a. I think that Mary smoked a cigar or John gambled.  
 b. I don’t think that Mary smoked a cigar or John gambled.  
 OK ‘I don’t think that M smoked a cigar and I don’t think that J gambled’
- (88) a. I think that either Mary smoked a cigar or (that) John gambled.  
 b. I don’t think that either Mary smoked a cigar or (that) John gambled.  
 # ‘I don’t think that M smoked a cigar and I don’t think that J gambled’

If (88b) with TP-initial *either* under extra-clausal negation is acceptable at all, it means something like this:

- (89) Someone proposed or concluded that either Mary smoked a cigar or (that) John gambled. I disagree with that proposal or conclusion.

Why the syntactic size of the scope of *either... or...* is relevant in English is not clear. As the Hungarian/Russian/French/Kannada examples show, other languages have dedicated exhaustive disjunctions with small-size syntactic scopes. It remains to be investigated whether English *either DP<sub>1</sub>/VP<sub>1</sub> or DP<sub>2</sub>/VP<sub>2</sub>* is perhaps genuinely ambiguous.

To summarize, disjunctions with particles reiterated on each disjunct come in two flavors. One is by and large synonymous with disjunctions that get by with one (overt) particle; see the upper row. The other is semantically distinct. It is construed as exhaustively listing all the possible options, the disjuncts have a tendency to be

<sup>35</sup> Jayaseelan (2008) and Slade (2011) point out that according to the Oxford English Dictionary, earlier stages of English had *or... or...*. The significance of the difference between *or... or...* and *either... or...* remains to be investigated.

interpreted as exclusive in non-embedded contexts, and do not have de Morganic readings in decreasing contexts; see the lower row. English *either... or...* has both flavors.

Sinhala / Malayalam / Kannada	Hungarian / French	English
DP <sub>1</sub> hari DP <sub>2</sub> hari (S)	XP <sub>1</sub> vagy XP <sub>2</sub>	XP <sub>1</sub> or XP <sub>2</sub>
DP <sub>1</sub> oo DP <sub>2</sub> oo (M, K)		either DP <sub>1</sub> /VP <sub>1</sub> or DP <sub>2</sub> /VP <sub>2</sub>
illa DP <sub>1</sub> illa DP <sub>2</sub> (K)	vagy XP <sub>1</sub> vagy XP <sub>2</sub> soit XP <sub>1</sub> soit XP <sub>2</sub>	either TP <sub>1</sub> or TP <sub>2</sub>

### 3.3 The morpho-syntax of J, MO and KA

This section touches on some of the issues that obviously call for further research. Section 3.3.1 suggests, based especially on work by Arsenijević and Mitrović, that the co-existence of Junction with MO and KA particles can be detected in morphologically complex connectives in multiple languages. Section 3.3.2 formulates working hypotheses regarding the postulation of null MO/KA particles.

#### 3.3.1 Complex connectives with Junction and MO/KA

Recall from (44)—(45), repeated in (91), that one of the iterated MO particles in Hungarian (*is*, though not *mind*) co-occurs with the connective ‘and’ that I analyze as Junction:

- (91) a. Kati **és** Mari ‘Kate and Mary’ Hungarian  
 b. Kati **is** Mari **is** ‘Kate as well as Mary’  
 c. Kati **is és** Mari **is** ‘Kate as well as Mary’

Mitrović (2012) and Mitrović and Sauerland (2014) quote a similar alternation from Avar (without commenting on distributivity):

- (92) a. keto **va** hve ‘cat and dog’ Avar  
 b. keto **gi** hve **gi** ‘cat and dog’  
 c. keto **gi va** hve **gi** ‘cat and dog’

The co-occurrence of the three morphemes supports the Winter/den Dikken-style analysis. Morphologically complex connectives lend further support to the claim that Junction co-occurs with MO and KA style particles.

Arsenijević (2011) observes that the Serbo-Croatian **disjunction** *ili* ‘or’ is composed of *i* ‘and/also/even’ and *li* ‘polarity particle’. The same holds for Russian, which I use for illustration.

- (93) a. Ivan **i** Petr  
 'Ivan and Peter'  
 b. Tancevala-**li** Masha?  
 'Did Mary dance?'  
 c. Ivan **ili** Petr  
 'Ivan or Peter'  
 d. **i** Ivan **i** Petr  
 'Ivan as well as Peter'

Mitrović (2012) and Mitrović and Sauerland (2014) point out copious relevant Indo-European examples. I use Classical Latin for illustration, based on Zumpt (1856). *-que* is a second-position clitic within its own conjunct. (94a) has *-que* only in the second conjunct; (94b) in both; in (94c) *-que* cliticizes to *at*, forming *atque*.<sup>36</sup>

- (94) a. arma virum**que** cano  
 'Of arms and the man I sing' (Virgil)  
 b. me**que** regnum**que** meum gloria honoravisti  
 'honor upon me and my realm of glory' (Sallust)  
 c. socii **atque** exterae nationes  
 'allies and foreign nations' (Cicero)

I assume, in line with the previous sections and with Mitrović (2012), that Latin *-que* is a MO particle and *ac/at* represents pair-forming J(unction). Departing from Arsenijević (2011), I assume that Serbo-Croatian/Russian *i* plays both roles, J and MO, and in *ili*, it appears in its Junction role. I have analyzed *li* as a KA particle. As argued above, the  $\cap$  and  $\cup$  operations themselves are always silent; note that they are not indicated below. Mitrović proposes that *-que* and *-li* attach to J by possibly post-syntactic head-movement from an initial position within the junct to J's right.


- (95) arma **et** virum  
 arms J man 'arms and [the] man'
- (96) arma-**que**/∅ ∅ virum-**que**  
 arms-MO J man-MO 'arms and [the] man'
- (97) socii-∅ **at-que que** nationes  
 allies-MO J-MO nations-MO 'allies and nations'

<sup>36</sup> Thanks to P. Elbourne, who pointed me to <http://www.logicmuseum.com/latin/conjunctions.htm>, where the examples come from. I refer the reader to this source for discussion of the data. According to Zumpt, iterated *-que* is used only in poetry, other than by the prose writer Sallust. Unfortunately, I am not aware of literature on the semantic differences between *et*, single *que*, and iterated *que*. Given the large corpora, it should be possible to investigate their meanings.



(98) Ivan **i** Petr  
 Ivan J Peter ‘Ivan and Peter’

(99) Ivan-∅ **i-li** ‡ Petr  
 Ivan-KA J-KA Peter-KA ‘Ivan or Peter’



If it is correct to analyze *i* as J(unction), the extraordinary interest of *ili* is that it offers direct evidence that the same overt J morpheme may occur in both conjunctions and disjunctions.

Why is it so rare to see the same J morpheme in disjunctions as in conjunctions? An alternative to the above analysis is to stipulate that J must be phonetically null, as do den Dikken (2006) and Jayaseelan (2014). This requires analyzing *and*, *és*, and their counterparts as belonging to the second (last) conjunct. There are two main possibilities then. One is that the J that occurs in (typical) disjunctions is indeed the same as the one that occurs in (typical) conjunctions—null in both cases. The other main possibility is that, in languages that appear to have just one, medial particle, the KA of the second (last) disjunct cliticizes to null J, or enters into an agreement relation with null J (see den Dikken 2006; Mitrović 2012; Jayaseelan 2014), i.e. it determines the spell-out of J in some way. These issues require further thought.

### 3.3.2 Working hypotheses relating to null MO/KA

The analyses make plain that I hypothesize the following:

(100) Hypothesis: When MO and KA are present, they are present in all the junct within JP, although it is possible for only the last MO/KA to be overt.

This hypothesis is motivated by my general account, which treats the semantic contributions of MO and KA as identical in all their occurrences (recall Sect. 1). Each MO/KA particle checks the same partial ordering or entailment relation between its host and the immediately larger context. I am not aware of interpretive facts that contradict (100). Why non-last MO/KA can fail to be spelled out obviously call for a morpho-syntactic explanation.

While hypothesis (100) allows for null allomorphs of MO/KA on non-final junct, I hypothesize that the presence of MO/KA must not be assumed in the total absence of phonological evidence. This is a reality-check hypothesis and may need to be refined.

(101) Hypothesis: The presence of MO/KA is realized by at least one overt morpheme or suprasegmental element (e.g. tone or contrastive stress).

Szabolcsi and Haddican (2004) point out that English *John AND Mary*, with stressed *AND*, is a strictly Boolean, distributive construction, in various respects similar to *John as well as Mary* and *both John and Mary*. It does not serve as a subject of

collective predication, and it only receives a ‘not both’ interpretation within the scope of negation.

- (102) a. # John AND Mary are a good couple.  
 b. # John AND Mary solved the problem together.  
 c. # John AND Mary drank up a bottle of wine between them.
- (103) I didn’t study math AND physics.  
 ‘not both’; #‘neither’

One analysis could be that the stress in evidence in (102)—(103) is nothing but a MO particle that cliticizes to the Junction *and*; i.e. that *AND* = J+MO. I do not wish to defend such an analysis here, but (101) is meant to allow for it in principle. However, (101) is meant to not allow for *John and Mary are tall* to receive its distributive interpretation from segmentally and suprasegmentally undetectable MO particles. Its distributive interpretation should come from the predicate, as is generally assumed.

#### 4 Conclusion

I argued that both MO and KA-style particles can be assigned a unified semantics across their various roles (well, at least those that I have looked at, a fairly big portion). Their role is to impose postsuppositional requirements, which can be satisfied when the immediately larger context is interpreted as the meet/join of their host’s semantic contribution with something else. They do not perform meet/join themselves. I assumed that  $\cap$  and  $\cup$  are phonetically null or disembodied operations, joining the ranks of type-shifters as well as purely meaning-changing silent actors, such as existential closure, the binding combinator **z**, negation, tense operators, and so on.

In the course of making that argument I recast the traditional syntax and semantics of many of the constructions involved. However, most of these innovations built on or drew from existing proposals in the literature. Those proposals were made in isolation from one another. Hopefully, they will live together happily ever after.

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