III. The busy lives of quantifier particles[i_Readings]

The English clusters {*some, or, whether*} and {*every, both, and, even, too, also*} look like a motley crew. But in many other languages, the same particles build quantifier words and serve as connectives, additive/scalar particles, question markers, existential verbs, etc.

Hoping to find some unity, we call the particles KA and MO particles, cross-linguistically.

(1)		Hungarian	Japanese	Gloss
	a.	**vala**-ki	dare-**ka**	`someone'
	b.	(**vagy**) A **vagy** B	A-**ka** B(-**ka**)	`A or B'
	c.	**vagy** száz	hyaku-nin-to-**ka**	`some 100 = ca. 100'
	d.	**val**-, **vagy**- --		`be' participial & finite stems
	e.	--	dare-ga VP-**ka**	`Who is VP-ing?'
	f.	[S-**e**]	S-**ka**	`whether S'

(2)		Hungarian	Japanese	Gloss
	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-mo B-mo	`A as well as B, both A and B'
	c.	A **is**	A-mo	`also/even A'

(A) Are these particles really "the same" across their varied environments? If yes, what is their stable meaning?

(B) How are the reiterated constructions in (1b) and (2b) pieced together and interpreted?

(A) Shared stable meanings?

(3) If the universe consists of four people, Adam, Bertha, Celine, and Daniel, then
   a. $\forall x[laugh'(x)]$ iff
      $laugh'(a) \wedge laugh'(b) \wedge laugh'(c) \wedge laugh'(d)$
   b. $\exists x[laugh'(x)]$ iff
      $laugh'(a) \vee laugh'(b) \vee laugh'(c) \vee laugh'(d)$

(4) a. The set of properties that **everyone** has is the **intersectio**n (meet, greatest lower bound) of the sets of properties that the first-order individuals in the universe have.
   b. The set of properties that **someone** has is the **union** (join, least upper bound) of the sets of properties that the first-order individuals in the universe have.

We have to work a bit on unifying these declaratives with questions (since KA particles also serve as question-markers).

Questions are interpreted as sets of propositions -- the sets of their possible answers.

Alternative Semantics (=the semantics of alternatives) has thrown a new light on the signature environments of KA. Hamblin 1973, Kratzer & Shimoyama 2002, Alonso-Ovalle 2006, Aloni 2007, AnderBois 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 (e.g. *Joe dances*) 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,

(5) a. *Who dances?, Someone dances, Kate dances or Mary dances or Joe dances*
{{w: dance_w (k)}, {w: dance_w (m)},{w: dance_w (j)}}
b. whether Joe dances
{{w: dance_w (j)}, {w: not dance_w (j)}}

(6) a. *Joe dances*
{{w: dance_w (j)}}
b. *Kate dances and Mary dances and Joe dances, Everyone dances*
{{w: dance_w (k) & dance_w (m) & 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 above 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 [[φ]] be an Inquisitive Semantic proposition, (5)--(6) re-emerge as (5′)--(6′).[1]

(5′) a. *Who dances?, Someone dances, Kate dances or Mary dances or Joe dances*
[[Kate dances]] ∪ [[Mary dances]] ∪ [[Joe dances]]
b. *whether Joe dances*
[[Joe dances]] ∪ [[¬ Joe dances]]

(6′) a. *Joe dances*
[[Joe dances]]
b. *Kate dances and Mary dances and Joe dances, Everyone dances*
[[Kate dances]] ∩ [[Mary dances]] ∩ [[Joe dances]]

Based on these, assuming Inquisitive Semantics, here's the stable semantics:

(7) KA corresponds to union/join/least upper bound,
MO corresponds to intersection/meet/greatest lower bound.

[1] 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. -- Alternative Semantics goes wrong with conjunctions and universals. We can holistically write their correct interpretations but cannot assemble them compositionally. Crucially, the intersection of singleton sets is empty. Inquisitive Semantics assigns more structure to propositions and thus gets the correct results. A "downward closed" set is a powerset: all the subsets are included.

(B) How to deal with reiterated constructions?

B.1 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 *şi*, and Japanese *mo* are among the examples.

(8)	Schematically	Hungarian
	John MO Mary MO danced.	János **is** Mari **is** táncolt.
	`John danced and Mary danced'	`John danced and Mary danced'

If all MOs are doing the same thing, then MO can't 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.[2] Slade (2011) was the first to identify the pattern in (9) as a critical one to account for. Sinhala *-hari* and *-də* (declarative and interrogative disjunctions, respectively) and Malayalam *-oo* are among the examples.

(9)	Schematically	Sinhala (Slade 2011)
	John KA Mary KA danced.	Gunəpālə **hari** Chitra **hari** 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*.

(10)	Schematically	Hungarian
	(Mary danced.) John MO danced.	János **is** 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 (10) 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.

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[2] 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.).

It turns out that *or* has a use that is fundamentally similar to that of *too*. The two sentences in (11) might be uttered by the same speaker or by different speakers. *Or, 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.

(11) 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.

(12)	Schematically	Hungarian
	John bought 100 KA books.	János vett **vagy** 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 (13a,b), which Karttunen (1977) treated as equivalent, without any comment on compositionality:

(13) a.	**if/whether** Mary danced	{{w: dance_w (m)},{w: not dance_w (m)}}
b.	**if/whether** Mary danced **or** not	{{w: dance_w (m)},{w: not dance_w (m)}}

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 will be this:

(14) MO and KA inhabit contexts that are 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.

B.2 How do we achieve this result?
It turns out that the particles fall into two distinct types, which has been recognized for Japanese but is much more clearly visible in Hungarian.

Shimoyama (2006: 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. (She doesn't comment on the reiterated case.) The fact that Hungarian covers the territory of *mo* with two distinct segments, *mind* and *is*, is consonant with Shimoyama's suggestion.

(15) 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-**mo** B-**mo**	`A as well as B, both A and B'
c.	A **is**	A-**mo**	`A too/even A'

Szabolcsi (2018)argues that these form two different constructions. Here's a shortened list of the differences (the paper also investigates Farsi, Turkish, Russian, ...)

Head on the clausal spine, see (16)-(17): ***is, sem***	**Quantifier-internal, see (18)-(19):** ***mind, vagy, akár, sem***
Particle follows host.	Particle precedes host.
Need not be part of a tuple.	Must be part of a tuple.
Doesn't build quantifier words.	Builds quantifier words.

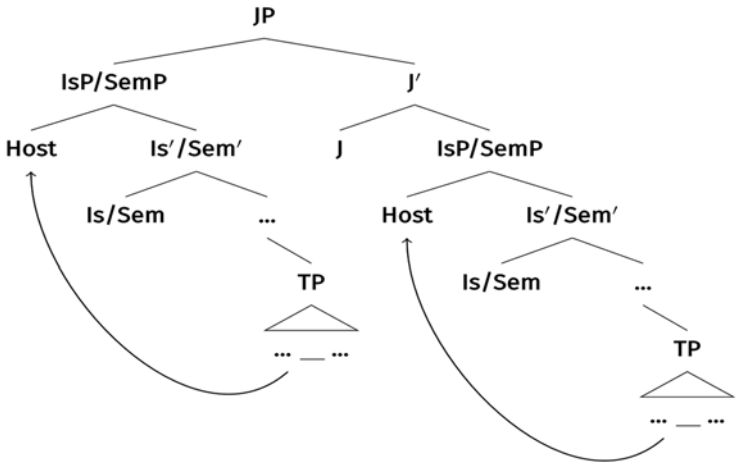
The reiterated quantifier particle constructions are propositional (type *t*) coordinations, Junction Phrases in the sense of den Dikken (2006). They involve ellipsis or structure-sharing when they look like constituent coordinations. They come in two distinct types. The difference pertains to syntactic structure and, accordingly, to the way the meanings are composed. It cannot be predicted from the basic truth-conditional semantics. The overall meanings of the two constructions may be similar or identical, and the same particle may participate in both constructions. For example, Hungarian *sem* and Farsi *ham* participate in both.

In one type, the particles are heads on the clausal spine, with a focus-accented constituent of the complement in their specifier. In the other type, the particles are uninterpreted and realize a silent propositional quantifier on each junct. Propositional quantification was introduced in Kratzer & Shimoyama (2002) for cases where the set of propositions quantified over contains alternatives generated by an indeterminate pronoun. Our case aligns with this nicely, but here the propositions quantified over are those expressed by the juncts.

In the other type, the reiterated construction is argued to represent one big quantifier, interpreted in terms of propositional quantification in the spirit of Kratzer & Shimoyama (2002). The overt particles are uninterpreted and merely signal the presence of a contentful but unpronounced quantifier. (Such a possibility was originally proposed by Carlson (1983, 2006); see Szabolcsi (2017) for an overview.)

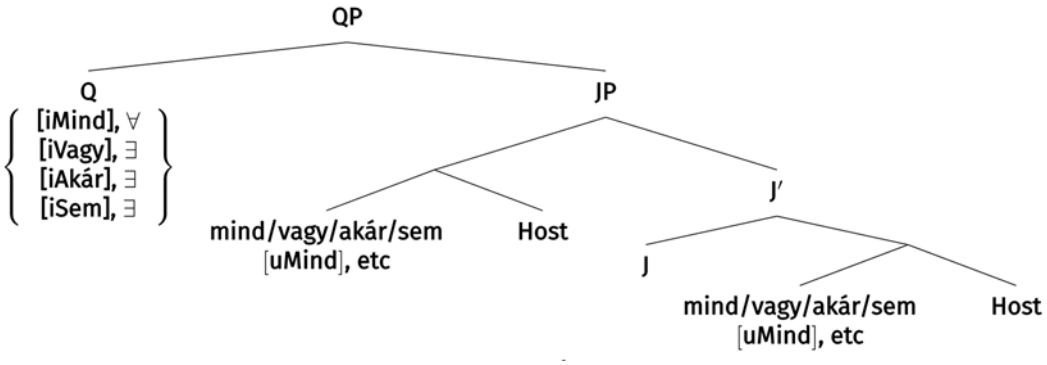
~~Strikethrough~~ indicates deletion (ellipsis) under identity.

(16) Where *is* `too,' *sem* `nor'



(17) a. A hó **is** esik, a gyerek **is** nyűgös.
the snow **too** falls the child **too** cranky
'The snow is falling, likewise the child is cranky.'
b. A hó **is** ~~esett~~, az eső is esett.
the snow **too** fell the rain too fell
'The snow as well as the rain were falling.'

(18) Where *mind* 'all', *vagy* 'or', *akár* 'whether', *sem* 'nor'



(19) a. **Vagy** a hó esik, **vagy** a gyerek nyűgös.
or the snow falls **or** the child cranky
'Either the snow is falling, or the child is cranky.'
b. **Vagy** a hó ~~esett~~, **vagy** az eső esett.
or the snow fell **or** the rain fell
'Either the snow or the rain was falling.'

(20) a. **Mind** a hó esik, **mind** a gyerek nyűgös.
all the snow falls **all** the child cranky
'Both the snow is falling and the child is cranky.'
b. **Mind** a hó ~~esett~~, **mind** az eső esett.
all the snow fell **all** the rain fell
'Both the snow and the rain was falling.'

Interpretations for the first type, heads on the clausal spine

The standard analysis of *too* easily extends to MO in *John MO ran* `John, too, ran'. *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.

Kobuchi-Philip's 2009 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 impose any presupposition on the context.

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, so a small amendment is called for. We can 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 & Szabolcsi (2013).

Interpretations for the second, quantifier internal type

(21) $\exists(\wp)$ = the proposition that is true when **some** $p \in \wp$ is true

(22) $\forall(\wp)$ = the proposition that is true when **all** $p \in \wp$ are true

The sets of propositions $\wp$ that $\exists$ and $\forall$ quantify over are defined with the help of an indeterminate ("wh") pronoun, as in (23a) or by enumeration, as in (23b,c). JP is understood to do nothing more than enumerate the members of such a set; in and of itself it is neither a conjunction nor a disjunction (Winter 1995, Szabolcsi 2015).

(23) a. $\wp = \{ p: \exists x[p=\lambda w.falls(x)(w)] \}$ `What is falling?'

b. $\wp = \{ \lambda w.falls(rain)(w),\ \lambda w.falls(snow)(w) \}$

c. $\wp = \{ \lambda w.falls(rain)(w),\ \lambda w.cranky(the\_child)(w) \}$

K&S use Hamblin semantics to define the set in (23a) by projecting alternatives from indeterminate pronouns. Instead, we define (23a) as in Karttunen 1977, by shifting a single proposition to a set of propositions and quantifying the indeterminate pronoun into that set using function composition.

Looking back at the reiterated constructions, the sentences containing the two versions mean the same thing, but those meanings are composed differently:

(24) A hó **is** az eső **is** esett = **Mind** a hó **mind** az eső esett.
the snow too the rain too fell all the snow all the rain fell

`The snow as well as the rain fell'

Appendix: Some cross-linguistic examples of reiterated particles (Szabolcsi 2018)

Table 1: *Too_Too*.

	X		**Y**		**Z**	**no tuple?**	**plain 'and'**
Hungarian	X is	(és)	Y is	(és)	Z is	✓ X is	és
Telugu	X-VV	(mariu/ inkaa)	Y-VV	(mariu/ inkaa)	Z-VV	✓ X-VV	mariu/ inkaa
Japanese	X mo	(? soshite)	Y mo	(soshite)	Z mo	✓ X mo	soshite
Bosnian	i X	(? a)	i Y	(a)	i Z	✓ i X	i
Russian	i X	*	i Y	*	i Z	✓ i X	i
Persian	X ham	*	Y ham	*	Z ham	✓ X ham	n/a
Turkish	X-dA	*	Y-dA	*	Z-dA	✓ X-dA	ve
Sinhala	X-(u)y	*	Y-(u)y	*	Z-(u)y	✓ X-(u)y	n/a
Mandarin	ye X	*	ye Y	*	ye Z	✓ ye X	he

Table 2: *Or_Or*.

	X		**Y**		**Z**	**'someone'**	**plain `or'**
Hungar.	vagy X akár X	* *	vagy Y akár Y	(pedig) (pedig)	vagy ^ Z akár ^ Z	vala-ki akár-ki, FCI	vagy
Turkish	ya X	*	ya Y	(dA)	ya ^ Z	-	veya
Bosnian	ili X	*	ili Y	(pak)	ili ^ Z	-	ili
Russian	ili X libo X to li X to li X	* * * *	ili Y libo Y to li Y to li Y	(zhe) (zhe) (zhe) (a)	ili ^ Z libo ^ Z to li ^ Z to li Z	- kto-libo - -	ili
Persian	ya X	*	ya Y	*	ya Z	-	n/a
Sinhala	X hari X də	* *	Y hari Y də	* *	Z hari Z də	kauru-hari kau-də	hari (reit.)
Mand.	huozhe X yaome X	* *	huoze Y yaome Y	* *	huozhe Z yaome Z	- -	huozhe

[i] Readings for Wednesday

Brasoveanu, Adrian and Anna Szabolcsi 2013. Presuppositional TOO, Postsuppositional TOO. *The Dynamic, Inquisitive, and Visionary Life of Φ, ?Φ, and ◊Φ Subtitle: A Festschrift for Jeroen Groenendijk, Martin Stokhof, and Frank Veltman* (2013)

Ciardelli, Ivano, Jeroen Groenendijk and Floris Roelofsen 2019. *Inquisitive Semantics.* Oxford UP.

Mitrovic, Moreno 2021. *Superparticles: A Microsemantic Theory, Typology, and History of Logical Atoms*. Springer.

Szabolcsi, Anna 1997. Background notions in lattice theory and generalized quantifiers. In Szabolcsi (ed.), *Ways of Scope Taking*, pp. 1-29. Springer.

Szabolcsi, Anna 2015. What do quantifier particles do?. *Linguistics and Philosophy*, *38*(2), pp. 159-204.

Szabolcsi, Anna 2017. Disembodied or phonetically null operators. https://ling.auf.net/lingbuzz/004073

Szabolcsi, Anna 2018. Two types of quantifier particles: Quantifier-phrase internal vs. heads on the clausal spine. *Glossa: a journal of general linguistics*, *3*(1).