NANOSEMANTICS & THE COMPOSITIONAL ANATOMY OF EXCLUSIVE DISJUNCTION

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1 PRELIMINARIES

1.1 Data

- I'm concerned here with a seemingly **illogical** fact of language that has gone unnoticed:

(1) ⟦**or**+**and** John **or**+**and** Mary⟧ = **either** John **or** Mary

- Two logically opposite particles build a complex particle that expresses strong disjunction (XOR).
- There seems to exists a **disharmonic mapping** between the **morphologically complex particle clusters** and the **logically/semantically simple meanings** they contribute.
- How can we reconcile this? By assuming compositionality **below the word level**.
- This is in line with the larger research programme:

1.2 Theory

WHAT WE KNOW

TH. 1 Interpretation is determined by a homomorphism between an algebra of syntactic representations [Syntactic Objects/SO] and an algebra of semantic objects.

TH. 2 Hierarchical syntactic structure applies "all the way down." (DM – Halle and Marantz 1993, et al. & seq.)

. . . BUT HAVEN'T REALLY DONE

SO undergo compositional interpretation.

SO need not correspond to words.

∴ Compositional analysis cannot stop at word level.
(Szabolcsi, 2010: 189, ex. 1)

- I demonstrate that there exists empirical evidence to support the view that Logical Forms (LFs) retain the morphosyntactic structure as they enter into composition.

THESIS: The logical complexity of an LF reflects the complexity of morphosynt. structure.

- We look into the 'word-shape' of a class of logical connectives and
  - implement the 'morphosemantic programme', and
  - answer the following QUESTIONS:
- Generally: What are the morphosyntactic atoms of logic, generally?
- Specifically: What are the morphosyntactic atoms of exclusive disjunction?

2 SUPERPARTICLES

2.1 Superparticles & Boolean primitives: formal ≈ natural-linguistic?

- Previous research by Szabolcsi (2010, 2014b), Kratzer and Shimoyama (2002) and Slade (2011), among many others, has established that languages like Japanese may use only two morphemes, *mo* and *ka*, to construct universal/existential as well as conjunctive/disjunctive expressions respectively.
- We abbreviate the Japanese *mo* particle and *mo*-like particles cross-linguistically as $\boxed{\mu}$ and the Japanese *ka* and *ka*-like particles cross-linguistically as $\boxed{\kappa}$.

(2) The μ-series (*mo*)
  a. Bill **mo** Mary **mo**
     B μ M μ
     '(**both**) Bill **and** Mary.'
  b. Mary **mo**
     M μ
     '**also** Mary'
  c. dare **mo**
     who μ
     '**every-/any-**one'
  d. dono gakusei **mo**
     INDET student μ
     '**every/any** student'

(3) The κ-series (*ka*)
  a. Bill **ka** Mary **ka**
     B κ M κ
     '(**either**) Bill **or** Mary.'
  b. wakaru **ka**
     understand κ
     'Do you understand**?**'
  c. dare **ka**
     who κ
     '**some**one'
  d. dono gakusei **ka**
     INDET student κ
     '**some** students'

- We assume that the two series of superparticle meanings in (2) and (3) do not result from homophony, *contra* Hagstrom (1998) and Cable (2010), as argued by Slade (2011) and Mitrović and Sauerland (2014).

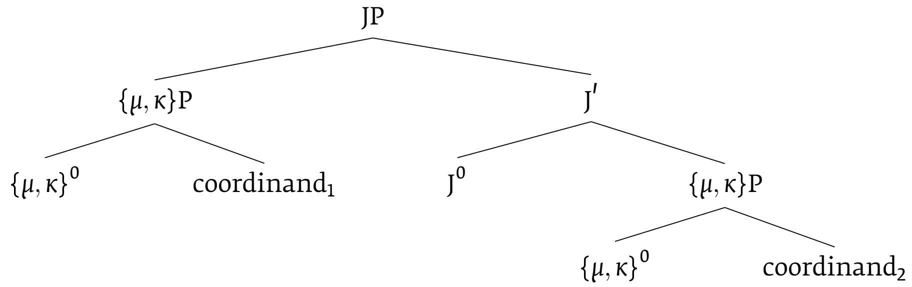
2.2 An articulated Junction system: Mitrović (2011, 2012, 2014)

(4) Three languages with tripartite conjunction marking:
  a. Kati **is és** Mari **is**
     K μ J M μ
     'Both Kate and Mary' (Hungarian; Szabolcsi 2014a)
  b. keto **gi va** hve **gi**
     cat μ J dog μ
     'cat and dog' (Avar; Ramazanov, p.c.)

c. **i** Roska **i i** Ivan
μ R J μ I
"Roska and also Ivan." (Macedonian; Stojmenova, p.c.)

- It is an independent fact that the non-medial (J-level) conjunction morphemes (*is, gi, i* in (4a)–(4c), respectively) are independently additives (in all three languages) and quantifiers or FCI-/NPI-markers (in Slavonic).
- Based on the evidence from Mitrović and Sauerland (2014) and Mitrović (2014), *inter. al.*, the non-J conjunction morphemes correspond to μ superparticles.
- Hence the novel and fine-grained syntactic structure for coordination is that of (5).

(5) A JP structure for coordiantion:



2.3 Lexical entries for the three heads

2.3.1 (Anti)exhaustive μ

- The μ marker (superparticle), fundamentally makes sure that the alternatives ($\mathfrak{A}$) of its host are obligatorily active, and consequently exhaustified.

(6) Lexical entry for $[\![\mu^0]\!]$:

$$[\![\mu^0]\!](\phi) = \mathfrak{X}^{(2)}(\phi)$$

- Exhaustification ($\mathfrak{X}$) procedure as per Chierchia (2013), int al.

2.3.2 Inquisitive κ

- The κ-series morphosyntactically covers disjunctive, existential and interrogative constructions, among some other meanings.
- We adopt Inquisitive Closure as the signature meaning:

(7) Lexical entry for $[\![\kappa^0]\!]$:

$$[\![\kappa^0]\!](\phi) = \mathbf{?}(\phi) = \phi \vee \phi$$

2.3.3 Pair-forming J

- The J(unction) head denotes a neutral structural common denominator for conjunction and disjunction and so its role will be to pair arguments up without stating whether the pair is conjoined or disjoined.

- We also posit an abstract Boolean operator that attaches to JP and enters into a checking relation with the heads of the coordinands. (We develop this below.)

- As per Szabolcsi (2014b) and Mitrović (2014), the J head is interpreted as a bullet-operator (•) (Winter, 1995, 1998)).

(8) Lexical entry for $[\![J^0]\!]$:

$$[\![J^0]\!](\phi)(\psi) = \phi \bullet \psi = \langle \phi, \psi \rangle$$

- How will an interpretational system know which of the two Boolean operations kicks in?

- We propose that the non-Boolean denotational of a JP is mapped onto Boolean meaning via an application of a Boolean operator, call it $\beta^{(0)}$, which will assign a Boolean mapping of tuples, i.e. from 'denotation-less' pairs into Boolean expressions.

- If $\beta^{(0)}$ is taken to be be syntactically projected in the syntax, then the choice of $\sqcap$ versus $\sqcup$ can be relegated to principles such as Minimality underlying Agree. (Derivational and interpretational procedures are thus rather the same.)

(9) Lexical entry for $[\![\beta^0]\!]$:

$$[\![\beta^0]\!](\phi \bullet \psi) = \begin{cases} \phi \wedge \psi & \text{if F-checking with } \mu \\ \phi \vee \psi & \text{if F-checking with } \kappa \end{cases}$$

3 SO MANY PARTICLES IN SO MANY LANGUAGES

- The empirical fact of (1) will entail two generalisations:

(10) GENERALISATION 1
Disjunction markers (κ-class) tend to be morphologically more complex than the conjunction markers (μ-class).

(11) GENERALISATION 2
Morphologically complex disjunction markers may include, at a sub-word level, the conjunction markers (μ-class).

3.1 Homeric Greek

- We start with Homeric Greek, where one of the disjunction markers, *ēte*, is morphologically complex in the sense that is comprises the disjunctive/interrogative κ-particle *ē* and a conjunction-signalling μ-particle *te*.

(12) **ē-t(e)** ehremen para soi
κ-μ keep with self
'. . . or to keep with yourself' (Il. T. 148)

- Interrogativity of *ē* is discussed at length in Denniston (1950: 282–284). The authoritative *Homeric dictionary* of Autenrieth (1895: 134) additionally glosses *ēte* as '(either. . .) or', or 'whether . . . or'.

- Another complex Homeric particle combination is *eite*, comprising of a conditional-signalling *ei* ('if') and the aforementioned conjunctive *μ*-particle *te*.

(13) **ei-te** boulesthe polemein emin **ei-te** filoi einai
κ-μ wish to be at war for myself κ-μ friend be
'whether you wish to wage war upon us or [else] to be our friends'
(Cyrop. 3.2.13.)

3.2 Old Church (and modern) Slavonic

- In Old Church Slavonic (OCS), as well the contemporary descendants of Old Common Slavonic, the disjunction marker *ili* is composed of an additive/conjunction marker *i* and an interrogative marker *li*.
- On its own, *li* is a κ-type superparticle, of the kind exhibited by Japanese in (3), and thus features in expressions of disjunction, interrogativity and existential quantification in OCS.

(14) **i** dšǫ **i** tělo
μ soul (J) μ body
'both body and soul' (CM. Mt. 10:28)

(15) **i**-**li** otca **i**-**li** mater'
μ-κ father.ACC (J) μ-κ mother.ACC
'either father or mother' (CM. Mk. 7:10)

- Note that the Slavonic κ morpheme *li* is a second-position clitic which triggers head-movement of the closes terminal by virtue of some (here stipulated) head-movement triggering feature [+ε].

3.3 Hittite

- In Hittite, too, the disjunction marker contains an additive morpheme.
- As Hoffner and Melchert (2008: 405) note, disjunction is regularly expressed in Hittite by *našma* 'or' or by *naššu …našma* 'either . . . or'. The *ma* marker is a conjunction marker (and indeed a μ-superparticle; see Mitrović 2014: 150–154).

(16) nu-šši **naššu** adanna peškezzi **naš-ma**-šši akuwanna peškezzi
now-him $\kappa^{?}$-(μ) =either eat give $\kappa^{?}$-μ-him drink give
'He either gives him to eat or he gives him to drink' (KUB 13.4 i 24)

3.4 Tocharian A

- Tocharian A (TA) also shows the same morphological complexity of its disjunction marking.
- In TA, the additive marker is *pe* and the complex disjunction marker clearly featuring *pe* is *e-pe*, with an additional *e-* morpheme. The pair of examples in (17) and (18) show the additive and (exclusive) disjunctive construction, respectively.

(17) **pe** klośäṃ nāñi
μ ears.DU 1.GEN
'also my ears' (TA 5: 53, b3/A 58b3 in Zimmer 1976: 90)

(18) ckācar **e**-**pe** śäṃ **e**-**pe**
sister κ-μ wife κ-μ
'(either) sister or wife' (TA 428: a4, b2; Carling 2009: 74)

- See Adams (2013: 89) and Edgerton (1953) for philological evidence.

3.5 North-Eeastern Caucasian

Our last set of decomposition-supporting data comes from a non-IE and non-extinct group of North Eastern Caucasian, Dargi and Avar.

3.5.1 Dargi

- Take an example featuring negative disjunction of the "*n*either. . . *n*or"-type, which shows the disjunctive morpheme *ya* head-initially and bisyndetically coordinating two DPs ('pilaf' and 'hen').

(19) nu-ni umx̂u sune-la mer.li-či-b b-arg-i-ra, amma **ya** pulaw, **ya** ‘är‘ä
me-ERG key(ABS) self-GEN place-SUP-N N-find-AOR-1 but κ pilaf(ABS) κ hen(ABS)
he-d-arg-i-ra
NEG-PL-find-AOR-1
'I found the key at its place, but neither the pilaf nor the chicken was there.' (van der Berg 2004: 203)

- Just like disjunction, conjunction also obtains polysyndetically through expression of an additive particle *ra*, as shown in (20), combining with several DPs to deliver conjunction.

(20) il.a-la buruš **ra** yurğan **ra** ‘änala **ra** kas-ili sa⟨r⟩i
this-GEN mattress(ABS) μ blanket(ABS) μ pillow(ABS) μ take-GER be.PL
'(They) took his mattress, blanket and pillow.'
(van der Berg 2004: 199)

- Exclusive disjunction, on the other hand, and perhaps by now not as surprisingly, features both *ya* (κ) and *ra* (μ) particles, as evidence in (21) shows.

(21) **ya ra** pilaw b-ir-ehe, **ya ra** nerğ b-ir-ehe
κ μ pilaf(ABS) N-do-FUT.1 κ μ soup(ABS) N-do-FUT.1
('What shall we make for lunch?') 'We' ll make (either) pilaf or soup.' (van der Berg 2004: 204)

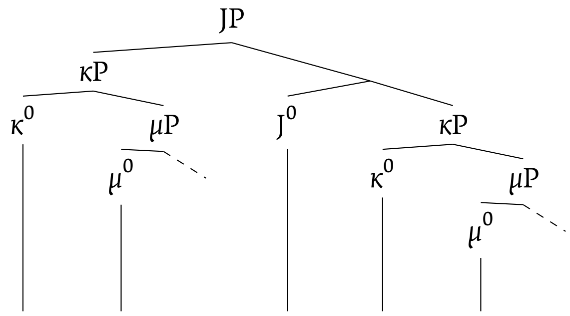
3.5.2 Avar

- The same compositional pattern is found in Avar, which expresses exclusive disjunction using a composed morpheme expression, containing a κ particle *ya*, being identical to the κ marker in Dargi, and a conjunctive/additive particle *gi*, which we introduced in (4b) and now repeat in (22) to show its conjunctive, or additive, semantics when not in presence of a disjunctive particle.

(22) keto **gi va** hve **gi**
cat μ J dog μ
'cat and dog' (Avar; Ramazanov, p.c.;=(4b))

(23) **ya gi** Sasha **ya gi** Vanya
κ μ S (J) κ μ V
'either Sasha or Vanya.' (Avar; Mukhtareva, p.c.)

Table 1: *Complex disjunction markers are their morphosyntax cross-linguistically*



Homeric	**ē**	**te**	∅	(**ē**	**te**)
OC Slavonic	**li**$_{[+\varepsilon]}$	**i**	∅	**li**$_{[+\varepsilon]}$	**i**
Hittite	**naš**	(**ma**)	∅	**naš**	**ma**
Tocharian A	**e**	**pe**	∅	**e**	**pe**
Dargi	**ya**	**ra**	∅	**ya**	**ra**
Avar	**ya**	**gi**	∅	**ya**	**gi**

3.6 Interim empirical summary

- A vast range of languages, living and dead, express disjunction using a conjunction marker. We provide in Tab. a summary of morhosyntactic facts.

4 Towards an analysis: making (and composing) sense of so many particles

- This gives us the following pattern:

(24) a. $\left[_{\text{JP}^+}\ \beta^0_{[\text{F:}\kappa]}\ \left[_{\text{JP}} \left[_{\kappa\text{P}_1} \kappa^0_1 \left[_{\mu\text{P}_1} \mu^0_1\ \ \text{XP}\right]\right] \left[\text{J}^0 \left[_{\kappa\text{P}_2} \kappa^0_2 \left[_{\mu\text{P}_2} \mu^0_2\ \text{YP}\right]\right]\right]\right]\right]$

b. $\bigsqcup\Big(\llbracket \text{J}^0 \rrbracket\Big(\llbracket \kappa^0_1 \rrbracket\Big(\llbracket \mu^0_1 \rrbracket(\llbracket \text{XP} \rrbracket)\Big)\Big)\Big(\llbracket \kappa^0_2 \rrbracket\Big(\llbracket \mu^0_2 \rrbracket(\llbracket \text{YP} \rrbracket)\Big)\Big)\Big)$

c. THEOREM. (b) $\vdash \llbracket \text{XP} \rrbracket \vee \llbracket \text{YP} \rrbracket \wedge \neg(\llbracket \text{XP} \rrbracket \wedge \llbracket \text{YP} \rrbracket)$

- In our calculation, the following additional tools are invoked:

(25) a. Disjunction as ordinary-alternative alternative set [AO] – disjunction corresponds to an alternative set. (Alonso-Ovalle, 2008)

b. Existential Constraint [∃C] – we assume JP has an existential presupposition (it shouldn't return an empty set as denotata).

c. Innocent Exclusion (♡) – contradictory alternatives are eliminated.

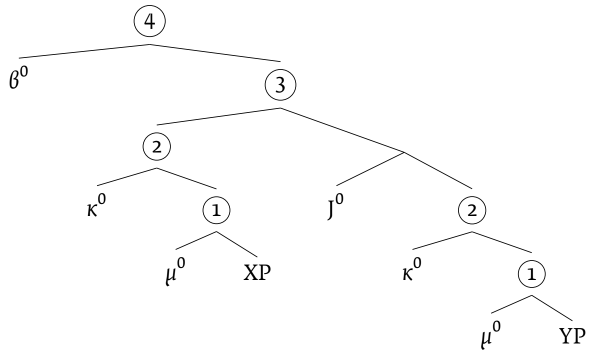
d. Hurford's constraint [HC] – alternatives that entail each are ♡.

- Our alternative tree involves two alternative-triggering operators, μ and κ superparticles, and one alternative-insensitive Junction head which will pair coordinands and let a c-commanding β operator turn the tuple into a Boolean expression, as per (**??**) and (**??**).

- The no-look-ahead principle will thus allow for 'embedded' alternatives, where a κ operator will function over a μ-triggered and exhaustified set of alternatives.[1]

- We will therefore end up computing and composing the meaning of a complexly-marked disjunction in four steps, as the morpho-syntactic analysis from the previous section suggested. These compositional steps are shown in (26) and paraphrased in (27).

(26) The compositional steps in interpreting $[\![\mathrm{JP}^+]\!]$:



(27) Paraphrasing the compositional steps in interpreting $[\![\mathrm{JP}^+]\!]$:

① $[\![\mu\mathrm{P}]\!]$ as FA of $[\![\mu^0]\!]$ and its argument (coordinand)
② $[\![\kappa\mathrm{P}]\!]$ as FA of $[\![\kappa^0]\!]$ and $[\![\mu\mathrm{P}]\!]$
③ $[\![\mathrm{JP}]\!]$ as tuple-forming FA of $[\![\mathrm{J}^0]\!]$ and two $[\![\kappa\mathrm{P}]\!]$s (structural coordinands)
④ $[\![\mathrm{JP}^+]\!]$ as FA of $[\![\beta^0]\!]$ and $[\![\mathrm{JP}]\!]$

In the paragraphs that follow, we take each of the compositional steps in turn, starting with the first.

Step ①

- The first compositional step concerns the μP.

- Assume a standard additive μ expression, where μ combines with a DP, like *John*, which, once point-wise 'lifted' to propositional level, contains no negative or modal markers. The presence of μ will activate alternatives of its host and, once active, alternatives need to undergo exhaustification.

- $[\![\mu\mathrm{P}]\!]$ has to be recursively exhaustified, since a single layer of exhaustification yields a contradiction in absence of a negative or a modal operator interpolating within the structure. A single level of exhaustification yields a contradiction in absence of (very possibly structurally defined) alternatives, as shown in (28a), since the proposition in question is the only available alternative to itself. The speakers are therefore assumed to rerun the Gricean reasoning and add another layer of exhaustification, which, given the result of the first level of exhaustification, now contains the exhaustified proposition as an alternative (28b). Once this alternative is denied, under standard assumptions, antiexhaustivity obtains, as per Mitrović and Sauerland (2014) and Fox (2007).[2]

1 As a matter of methodological principle of theoretical stance, we will also assume that there are no semantically vacuous morphemes: therefore a derivation adds compositional meaning.
2 See also Gajewski (2008) and Katzir (2007), *inter. al.*, on this matter.

(28) a. First layer of exhaustification:

$$\begin{array}{rcl} \mathfrak{X}(p)(\{p\}^{\mathfrak{A}}) & = & p \wedge \neg p \\ & \vdash & \bot \end{array}$$

b. Second layer of exhaustification:

$$\begin{array}{rcl} \mathfrak{X}(p)\Big(\{\mathfrak{X}(p)\}^{\mathfrak{A}}\Big) & = & p \wedge \neg\mathfrak{X}(p) \\ & \nvdash & \bot \end{array}$$

- For details and further arguments for iterativity of $\mathfrak{X}$, see Sauerland 2004, Fox 2007 and Mitrović and Sauerland 2014, *inter. al.*.

Step ②: interpreting κP We now take a structural step higher, where the result of step 1, $[\![\mu\text{P}]\!]$, namely (28b), is fed into κ, assumed to be an incarnation of an Inquisitive operator.

- κ takes the *μ*P with the denotation $[p \wedge \neg\mathfrak{X}(p)]$ as complement and perform inquisitive closure, i.e. a disjunction of $[\![\mu\text{P}]\!]$ and its negation. Via De Morgan equivalnce (DeM), we get the meanings of individual disjuncts, as shown in (30). We also invoke Alonso-Ovalle's (2006) principle of converting disjunction to sets.

(29) Composing κP:

$$\begin{array}{rrcl} & [\![\kappa\text{P}]\!] & = & [\![\kappa^0]\!]([\![\mu\text{P}]\!]) \\ & & = & \lambda p[p \vee \neg p]\Big([p \wedge \neg\mathfrak{X}(p)]\Big) \\ & & = & [p \wedge \neg\mathfrak{X}(p)] \vee \neg[p \wedge \neg\mathfrak{X}(p)] \\ \text{(by DeM)} & & = & [p \wedge \neg\mathfrak{X}(p)] \vee [\neg p \vee \mathfrak{X}(p)] \\ & & = & \Big\{[p \wedge \neg\mathfrak{X}(p)], [\neg p \vee \mathfrak{X}(p)]\Big\} \\ & & = & \Big\{\{[p \wedge \neg\mathfrak{X}(p)]\}, \Big\{\{\neg p\}, \{\mathfrak{X}(p)\}\Big\}\Big\} \end{array}$$

- The result of (30) is true for both of the disjuncts, hence a pair of such sets is paired up by J^0.

Step ③: interpreting JP We now pair up the two κ-marked coordinands, with an embedded *μ*P each, via the Junction head.

(30) Composing JP:

$$\begin{array}{rrcl} & [\![\text{JP}]\!] & = & [\![\text{J}^0]\!]\Big([\![\kappa\text{P}_1]\!]\Big)\Big([\![\kappa\text{P}_2]\!]\Big) \\ \text{(by Lex. it.)} & & = & \lambda y \lambda x[x \bullet y]\Big([\![\kappa\text{P}_1]\!]\Big)\Big([\![\kappa\text{P}_2]\!]\Big) \\ \text{(by FA)} & & = & [\![\kappa\text{P}_1]\!] \bullet [\![\kappa\text{P}_2]\!] \\ & & = & \langle [\![\kappa\text{P}_1]\!], [\![\kappa\text{P}_2]\!] \rangle \\ & & = & \Big\langle [[p \wedge \neg\mathfrak{X}(p)] \vee [\neg p \vee \mathfrak{X}(p)]], [[q \wedge \neg\mathfrak{X}(q)] \vee [\neg q \vee \mathfrak{X}(q)]] \Big\rangle \\ \text{(by AO)} & & = & \Bigg[\Big\{\{[p \wedge \neg\mathfrak{X}(p)]\}, \Big\{\{\neg p\}, \{\mathfrak{X}(p)\}\Big\}\Big\}\Bigg] \\ \text{(by AO)} & & = & \left\langle \left[\left\{ \begin{array}{l} \{[p \wedge \neg\mathfrak{X}(p)]\}, \\ \Big\{\{\neg p\}, \{\mathfrak{X}(p)\}\Big\} \end{array} \right\} \right], \left[\left\{ \begin{array}{l} \{[q \wedge \neg\mathfrak{X}(q)]\}, \\ \Big\{\{\neg q\}, \{\mathfrak{X}(q)\}\Big\} \end{array} \right\} \right] \right\rangle \end{array}$$

Step ④: enter β In the last step, we complete the composition by turning the JP-pair into a Boolean expression.

- Minimality will ensure that the uninterpretable feature [uF :] on β^0 is checked by κ^0 bearing [$i\kappa$]. The checked feature [~~u~~F : κ] is then interpreted as an instruction to map ⟦JP⟧ via UJ to a disjunction.

(31) Composing JP^+:

$$\begin{aligned}
[\![JP^+]\!] &= [\![\beta^0]\!]\Big([\![JP]\!]\Big) \\
\text{(by F-check.)} &= \lambda\langle x,y\rangle\,[x \vee y]\Big(\langle[\![\kappa P_1]\!],[\![\kappa P_2]\!]\rangle\Big) \\
\text{(by FA)} &= [\![\kappa P_1]\!] \vee [\![\kappa P_2]\!] \\
&= \langle[\![\kappa P_1]\!],[\![\kappa P_2]\!]\rangle \\
&= \left[\left\{\begin{matrix}\{[p \wedge \neg\mathfrak{X}(p)]\},\\ \{\{\neg p\},\{\mathfrak{X}(p)\}\}\end{matrix}\right\}\right] \vee \left[\left\{\begin{matrix}\{[q \wedge \neg\mathfrak{X}(q)]\},\\ \{\{\neg q\},\{\mathfrak{X}(q)\}\}\end{matrix}\right\}\right] \\
\text{(by AO)} &= \left\{\left\{\begin{matrix}\{[p \wedge \neg\mathfrak{X}(p)]\},\\ \{\{\neg p\},\{\mathfrak{X}(p)\}\}\end{matrix}\right\}, \left\{\begin{matrix}\{[q \wedge \neg\mathfrak{X}(q)]\},\\ \{\{\neg q\},\{\mathfrak{X}(q)\}\}\end{matrix}\right\}\right\}
\end{aligned}$$

- The resulting denotation, however, is an inconsistent set. We simplify the denotation of the entire JP in (32), which contains two maximal consistent subsets, given in (32a) and (32b).

(32) $[\![JP^+]\!] = \left\{\begin{matrix}[p \wedge \neg\mathfrak{X}(p)], & [\neg p \vee \mathfrak{X}(p)], \\ [q \wedge \neg\mathfrak{X}(q)], & [\neg q \vee \mathfrak{X}(q)]\end{matrix}\right\}$

a. $\Big\{[p \wedge \neg\mathfrak{X}(p)], [q \wedge \neg\mathfrak{X}(q)]\Big\}$ .... excludable: HC

b. $\Big\{[\neg p \vee \mathfrak{X}(p)], [\neg q \vee \mathfrak{X}(q)]\Big\}$

i. $\{\{\neg p\},\{\neg q\}\}$ .... excludable: ∃C

ii. $\{\{\mathfrak{X}(p)\},\{\mathfrak{X}(q)\}\}$ .... ✓

- Since the entire set (32) is inconsistent, one of the two maximal consistent subsets is the resulting denotation. The first consistent set in (32a), however, is excludable for two reasons. For one, (32a) violates HC. We sketch a proof of this in (33).

(33) Sketch of a proof: as per our assumptions, let $p, q \in$ C. The alternative set $\Big\{[p \wedge \neg\mathfrak{X}(p)], [q \wedge \neg\mathfrak{X}(q)]\Big\}$ thus comprises of the two disjunct candidates. The first, $[p \wedge \neg\mathfrak{X}(p)]$ entails q since $\neg\mathfrak{X}(p) \vdash q$, and $[q \wedge \neg\mathfrak{X}(q)]$ entails p since $\neg\mathfrak{X}(q) \vdash p$. This violates HC. ■

- Wrt. the other consistent subset in (32b): either *only* one disjunct is true ($\mathfrak{X}(p)$), or else that disjunct is not the case ($\neg p$). This, however, still allows for both disjuncts to be false ($\neg p \vee \neg q$) and we end up nothing (i.e., with the wrong meaning, paraphrasable as "neither... nor").

- We assume an existential presupposition (∃C) blocks this meaning.

- The second subset of (32b-ii), however, contains a mutually-exclusive doubleton subset (32b-ii), which asymmetrically entails (32b-i). This is the desired result with the exclusive component.

5 Conclusion

- We tried making sense out of complex morphology for, what seems to be, a rather simple meaning of 'or' or '$\vee$'.
- The exclusive component was derived as a computational consequence of five-head/operator ($1 \times J^0, 2 \times \kappa^0, 2 \times \mu^0$).
- The calculation is schematised in derivation/interpretation parse in the Appendix (34). (See Mitrović 2016 for details.)

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APPENDIX

(34) A full derivation/composition of complexly marked disjunction: