Decomposing coordination*

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1. Introduction

Natural languages display a surprising diversity of expression of elementary logical operations. The study of this variation is emerging as an important topic of cross-linguistic semantics. In this paper, we address the expression of coordination from this perspective, especially coordination of individual denoting expressions such as *John and Mary*. We argue that there is an underlying universal structure for individual coordination, and that the cross-linguistic variation can be explained by assuming that languages pronounce different morphemes of this universal structure. In particular, we argue that there two main types of system for the expression of individual coordination: the J-type and the μ-type. In μ-type languages the morpheme used for individual coordination also has uses a quantificational or focus particle, while in the J-type languages it doesn't. Instead at least in many J-type languages the same morpheme is used for individual and propositional coordination. The evidence we present for our model comes from two sources: new data from specific data of the J-type and μ-type languages, and from a study of the historical development of the expression of individual coordination in Indo-European which switched from a μ-type to a J-type system.

To illustrate the two types, compare English and Japanese. In English, the morpheme *and* expresses both propositional and individual coordination. In Japanese, the morpeme *mo* also is polyfunctional, but differs substantially from English *and* as shown in (1). To express individual coordination in (1-a), two occurrences of *mo* are necessary. In addition *mo* can express the meaning of the additive particle *also* in English, and the meaning of the universal quantifier *every* in English. For disjunction, a similar difference between English and Japanese exists as shown by (2). Crosslinguistic research has found that both types

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are attested by many languages. Besides English, German and the vast majority of modern Indo-European languages display the J-type pattern. And in addition to Japanese, Hungarian, Malayalam, and several extinct Indo-European languages display the μ-type system. Our main claim is that conjunction universally has two morphemes, *and* and *mo*, and one tends to be silent. We call *and* the J(unction) head, following Den Dikken (2006) and *mo* the μ head. Disjunction universally also involves two morphemes: *and* (J) and *ka* (we call this morpheme κ cross-linguistically), but the pronunciation is more variable.

(1) 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**one'

d. dono gakusei **mo**
INDET student μ
'**every** student'

(2) 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'

The polyfunctionality of *and* in the J-type languages and *mo* in the μ-type languages could in principle have two sources: they could be cases of accidental homophony or the different occurrences of *and* and *mo* could be occurrences of the same item. For *and* in English, Winter (1996) argues in favor of a single lexical item, but the different uses of *mo* have been generally regarded as different items, though the matter hasn't been thoroughly discussed (Hagstrom 1998, Shimoyama 2006, Yatsushiro 2002). In section 2, we provide the first of two arguments against homophony, drawing especially from Japanese. In the subsequent sections 3 and 4, we then present our proposal for a structure of coordination that can underly both the J-type and μ-type systems. In section 5, we sketch a corresponding proposal for disjunction.

2. Arguments against accidental homophony

Hagstrom (1998) and others claim that Japanese has two distinct formatives, *mo* ('and') and *mo* ('every') that happen to be homophonous in Japanese. An initial reason to be sceptical of this proposal is that Gil (2011) reports that two-thirds of languages (66%) in a sample of $N = 76$ show formal similarity between quantificational, focal and coordinate constructions like in Japanese. If the homophony analysis is to be entertained, one wonders how to reconcile the cross-linguistic frequency of homophony in this grammatical area of 'logical words'.

In the course of this paper, we provide two further counterarguments: within this section, we state a straightforward disproof from Japanese, drawing from data on coordinated

quantifiers. A second, historical, argument is given in section 4 and will draw from Indo-European.

As the following data suggests, *mo* and *ka* can simultaneously express coordination and quantification. The homophony analysis predicts, *ceteris paribus*, that the two homophonous *mo*-formatives corresponding to 'and' and 'every' should be able to co-occur. As the b-examples in (3) and (4) show, this does not obtain.

(3) a. dono gakusei **mo** dono sensei **mo** hanashita
INDET student MO INDET teacher MO talked
'Every student and every teacher talked.'

b. *dono gakusei **mo mo** dono sensei **mo mo** hanashita
INDET student MO MO INDET teacher MO MO talked
'Every student and every teacher talked.'

(4) a. dono gakusei **ka** dono sensei **ka** ga hanashita
INDET student KA INDET teacher KA NOM talked
'Some student or some teacher talked.'

b. *dono gakusei **ka ka** dono sensei **ka ka** hanashita
INDET student KA KA INDET teacher KA KA talked

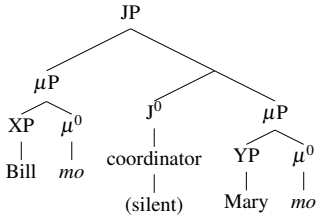
These data are unexpected on the homophony analysis, but as we show in the next section they follow from our proposal. The homophony analysis would need to postulate a morphological rule that reduces the predicted *mo-mo* sequences to a single *mo*.[1] Our historical argument against the homophony analysis derives from the data we describe in section 4 below because a second aspect of these data is relevant to our analysis. The Indo-European data show identical historical change of the μ-marker in historical development. The clearly is not predicted by the homophony analysis, which instead predict independent historical development for the different functions. In the following section, we proceed to our core theoretical proposal.

3. The structure of conjunction

The universal syntactic structure for individual coordination we propose is illustrated in (5) for the Japanese phrase (1). Our proposal is similar to that of Munn (1993) and den Dikken (2006) but we extend his syntactic account to polysyndetic conjunction so as to capture (1-a):

[1]Chris Golston (p.c.) reminds us of a possible precedent for such a reduction rule: Poser (1984, p. 178) proposes a *no*-Haplology rule that applies to some *no-no* sequences.

(5)



For the semantics in (6), we take the μ head to be essentially the logical subset operator and propose that J^0 corresponds to intersection.

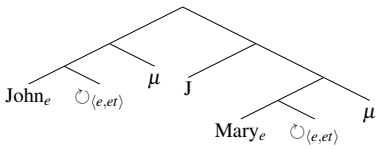
(6) a. $[\![\mu^0]\!](R^{\langle et\rangle})(S^{\langle et\rangle}) = R \subseteq S$
b. $[\![J^0]\!] = (Q_1^{\langle ett\rangle})(Q_2^{\langle ett\rangle}) = Q_1 \cap Q_2$

Our proposal is also similar to the semantic account of individual coordination in English of Winter (1995). But there are two differences, one minor and one major: for one, Winter proposes to derive the intersective meaning we ascribe to J^0 further from Boolean coordination. Secondly, Winter assumes that the contribution to sentence meaning we ascribe to μ^0 is not lexical meaning, but rather are silent type-shifting operations. Since we show that overt morphemes like *mo* carry the relevant meanings, our proposal is more straightforward to reconcile with the data.[2]

We now proceed to extend the proposed lexical entries to the three signature meanings (1) of *mo*.

Conjunction We assume that $\circlearrowleft_{\langle e,et\rangle}$ marks the typeshift from type e to $\langle et\rangle$, the characteristic property of an individual. Then, the structure in (7) correctly predicts conjunction, as it entails that the singleton sets {John} and {Mary} both be subset of the verbal predicate. Note that the concatenation of $\circlearrowleft_{\langle e,et\rangle}$ and μ amounts to Montague's type-shift from an individual to the set of a sets containing that individual.

(7)



The lexical meanings entail that universally *both* μ and J need to occur when two DPs of type e are coordinated if no type-shifting is available: μ alone would result in a type mismatch, and J alone would result in the empty set as it would obtain the intersection of two different singleton sets, which we take to be blocked or undetectable as a contradiction.

[2]Chierchia (1998) proposes that the presence of a morpheme with the meaning of an otherwise available type-shift blocks that type shift in a language. Winter would need to appeal to such an additional assumption.

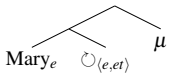
Universal quantification For universal quantification, we follow Shimoyama (2006) to assume that the 'indeterminate' *dono* combined with the common noun *gakusei* is interpreted as a set of type $\langle et \rangle$: the set of students. The truth conditions of (8) are correctly predicted: the students must form a subset of the talkers.

(8)

Additivity We propose to derive the additive use in (9) from recursive exhaustification and the structure in (10).

(9) Mary **mo** genki desu
Mary μ well is
'Also Mary is well.'

(10)



We assume that both occurrences of **Exh** in (11-a) associate with *mo* in (11-a). The unexhaustified sentence (9) has the same truth conditions as the corresponding sentence without *mo*, however, only the sentence with *mo* has the one without as a scalar alternative (Katzir 2007). Therefore the alternative set C_2 contains *Mary is well* without **Exh** or *mo*, and the alternative set C_1 contains (11-b). We diverge from Fox (2007) in how the alternative set in (11-b) is determined: While Fox assumes that C_2 is held constant, to derive the additive use we must assume that **Exh** in (11-b) can associate with *Mary* since the original associate of **Exh**, *mo*, is not present in this focus alternative. Therefore the alternative set C contains alternatives like *John is well*. This derives the additive meaning that *Not only Mary is well* for (11-a).[3]

(11) a. $\textbf{Exh}_{C_1}$ [$\textbf{Exh}_{C_2}$ Mary $\textbf{mo}_F$ is well]
b. $\textbf{Exh}_{C}$ [[Mary]$_F$ is well]]

4. Prediction of the J-μ system

Our proposal predicts the following generalizations on coordinator typology: The J-type coordination has propositional uses, but does not double (**John and Mary and*) and cannot have quantificational or additive uses. The μ-type on the other hand combines DPs, doubles (*John-mo Mary-mo*), and can have quantificational, additive and even disjunctive uses (the latter are addressed in section 5). Our proposal also comes with a prediction concerning language change: if a language changes from one of the two systems to the other, this should be due to the pronunciation of a part of the J-μ structure not previously pronounced, but used elsewhere in the language – either the propositional coordinator (in the case of μ-to-J change) or a quantificational particle (in the case of J-to-μ change). We have evidence that these predictions are borne out,[4] but can present only a few selected case in this paper for reasons of space. Specifically we show synchronic cases where both J and μ can be

[3] We predict slight differences between Japanese *mo* and additive particles in English (Kripke 2009). At this point, we haven't investigated these predictions.

[4] Except for the prediction for a μ-to-J change where we don't know of any example of such a change.

pronounced, and a diachronic argument that in a μ-to-J change, propositional conjunction is the source of J.

4.1 Synchronic evidence for the J-μ-System: SE Macedonian, Hungarian, Avar

In this subsection, we consider contemporary languages, which show evidence for the split coordination structure, i.e. two coordinator positions.

SE Macedonian Southeastern Macedonian boasts a rich set of overt coordinate positions. Aside from the standard (English-like) type (12) and a polysyndetic (*both/and*-like) type (13) of conjunctive structure, Southeastern Macedonian also allows a 'union of exponency' of the latter two (15) shows:

(12) [Roska] **i** [Ivan]
(μ^0) R J^0 (μ^0) I
'Roska and Ivan.'

(13) [**i** Roska] [**i** Ivan]
μ^0 R (J^0) μ^0 I
'both Roska and Ivan.'

(14) [Roska] **i** [**i** Ivan]
(μ^0) R J^0 μ^0 I
'Roska and also Ivan.'

(15) [**i** Roska] **i** [**i** Ivan]
μ^0 R J^0 μ^0 I
'both Roska and also Ivan.'

It is only SE Macedonian among the Indo-European languages that, to the best of our knowledge, allows pronunciation of all three coordinate heads (two μ^0 and a J^0) without an explicit counterexpectational (*but*-like) morpheme. SerBo-Croatian, as reported in (16), also allows three coordinate morphemes per two conjuncts but the J head is adversative, unlike (15).

(16) [**i** Mujo] **a** [**i** Haso]
μ^0 R J^0.but μ^0 I
'Not only Mujo *but* also Haso.'

Hungarian Beyond Slavonic (and Indo-European), we also find triadic exponency of conjunction in Hungarian, which our system predicts, i.e. the phonological realisation of the two μ heads and the J head, as per (5). Hungarian allows the polysyndetic type of conjunction with reduplicative conjunctive markers. As given in (17), Hungarian allows the optional realisation of the medial connective *és* (=J^0) co-occurring with polysyndetic additive particles *is* (=μ^0), as Szabolcsi (2013: 17, fn. 21) reports.

(17) Kati **is** (**és**) Mari **is**
K μ J M μ
'Both Kate and Mary'

Avar Avar, a northeast Caucasian language of Daghestan, provides such evidence.[5] Avar boasts three structural possibilities for conjunction. It first allows coordinate constructions

[5]This novel data was provided by Ramazanov (p.c.) and Mukhtarova (p.c.).

of the polysyndetic (Latin *que/que*, Japanese *mo/mo*) type ((18)), which, according to our JP system, involves two overt μ heads and a silent J^0.

(18) keto **gi** ħve **gi**
cat μ (J) dog μ
'cat and dog'

Taking *gi* to be of μ category, we predict it to feature independently given the prediction of subphrasal-status of complement to J^0. This in fact obtains and the *gi*-phrase—a μP—exhibits additive (focal) semantics. The following shows the strings and (generalized) structures of such μPs in Avar.

(19) Dida [g'yeb **gi**] l'ala
I know μ this
'I [**even/also know**] this'

(20) [Dida **gi**] g'yeb l'ala
I μ know this
'[**Even I/I too**] know this'

Aside from the polysyndetic type (21), Avar also allows an English-like construction with a conjunction marker placed between the two coordinands (22), which we take to be a phonological instantiation of J^0:

(21) keto **gi** ħve **gi**
cat μ (J) dog μ
'cat and dog'

(22) keto **va** ħve
cat (μ) J dog (μ)
'cat and dog'

(23) keto **gi va** ħve **gi**
cat μ J dog μ
'cat and dog'

It is the possibility of co-occurring realizations of the two types of positions that Avar allows which is typologically novel and, for our purposes, most intriguing. The last type (23) shows a 'union of phonological realisations' in (21) and (22) and the triadic exponency of conjunction. In this construction type, both μ heads as well as J are realised simultaneously.

4.2 Historical evidence for the J-μ-System: Indo-European

Our proposal of two distinct types is further supported by evidence from historical change. Seven branches of Indo-European (Indo-Aryan, Iranian, Italic, Celtic, Greek, Germanic, and Slavonic) show a development from a system of coordination using a μ-type coordinator to one using an J-type coordinator (Mitrović 2011), while only Slavonic has preserved a μ-type coordinator as shown in the previous section. Our proposal is supported especially by the fact that in no case, the same morpheme ever developed from a μ-type to an J-type coordinator, but instead a clausal coordinator was extended to DP-coordination. For example, Latin had both coordinators *-que* (μ-type) and *et* (J-type), but modern Italic only *e* (J-type). Note that the data we present below also argue against the homophonoy analysis

discussed in section 2 because the μ-connector underwent historical changes in all three of its functions.

Indo-European (IE) languages show a syntax (and semantics) of coordination that is consistent with the particle behaviour in Japanese. Old IE shows that the grammar of coordination had two core properties. Firstly, there existed two types of constructions for coordination: (a) one in which the coordinator occupies the initial (first) position, and (b) another in which the coordinator occupies the peninitial (second) position with respect to the second conjunct. Secondly, there existed two types of interpretation for one type of particle.

Across the entire IE family, two morphosyntactic patterns of coordination are found as Agbayani and Golston (2010) have investigated most recently. In one type of coordinate construction, the coordinator occupies the peninitial—that is, enclitic in second—position with the respect to the internal (second) coordinand, while in another type, the coordinator is initially placed between any two, or more, coordinands, as the examples of peninitial (a) and initial (b) placements of the coordinators in the following pairs, geographically spanning eastward, from Old Irish (24), Classical Latin (25), Gothic (26) and Old Avestan (27) show. For a wider set of data and further empirical discussion, see Mitrović (in progress).

(24) a. boí Conchuḃur **ocus** maithi
was.3.SG.AOR C.M.NOM.SG and the nobles.PL.NOM
Uladȧ^{N} i^{N} nEmṅuin
Ulstermen.M.PL.GEN in Emain
'Conchobar and the nobles of the Ulstermen were in Emain.'
(OLD IRISH; *Compert Con Culainn*, 1.1)

b. ba **ċ** ri Temrach
COP and king Tara.GEN
'And he was king of Tara.' (OLD IRISH; *Laws*, 4.179; Thurneysen 2003)

(25) a. ad summam rem pūblicam *atque* ad omnium nostrum [...]
to utmost weal common and to all of us
'to highest welfare and all our [lives]' (LATIN; Cic., *Or.*, 1.VI.27-8)

b. vīam samūtem *que*
life safety and
'the life and safety' (LATIN; Cic., *Or.*, 1.VI.28-9)

(26) a. ak ana lukarnastaþin **jah** liuteiþ allaim þaim in
neither on candle.DAT.SG and light.IND.3.SG all.DAT.PL it.DAT.PL in
þamma garda.
that.M.DAT.SG house.M.DAT.SG
'Neither do men light a candle, and put it under a bushel.'
(GOTHIC; *Codex Argenteus*, Mt. 5:15)

b. wopida Iesu qaþ **uh** imma.
called.PRET.3.SG J.ACC said.PRET.3.SG μ^{0}.and him.M.DAT.SG

'(Then Pilate entered into the judgment hall again, and) called Jesus, and said unto him.' (GOTHIC; *Codex Argenteus*, Jn. 18:33)

(27) a. **uta** mazdå huruϑma haoma
and wisdom.M.SG.GEN increase.M.SG.NOM haoma.M.SG.VOC
raose gara paiti
grow.2.SUBJ.MID mountain.SG.M.LOC toward
'And [thus] may you grow upon that mountain, O Haoma, [bringing] the increase of wisdom, [...].' (OLD AVESTAN; *Yasna HaptaNhāiti*, 10.4)

b. yūžəəm aēibiiō ahurā aogō
you.2.SG.NOM them.PL.DAT lord.M.SG.VOC strength.N.SG.ACC
dātā aṣ̌ā xṣ̌aϑrəm **cā**
give.2.PL.AOR.IMP truth.N.SG.INST power.N.SG.ACC and
'O Lord, may you give strength to them2 through Truth and that power [...]'
(OLD AVESTAN; *Yasna HaptaNhāiti*, 29.10)

Diachronically, what is uniform across the old old IE languages, is the loss of the peninitial configuration and survival of the initial type, i.e. the initial configuration (b) wins over time. The four minimal pairs of pen/initial configurations of coordination above seem to suggest a single differentiating fact between a- and b-type of coordination, namely linear placement. There is one additional, and for our purposes crucial, fact distinguishing the initial (a) and the peninitial (b) types of coordinators. That difference lies in the morphological structure of the two series.

While peninitial coordinators are monomorphemic, the initial coordinators are bimorphemic. Since initially placed coordinators are bimorphemic, they are decomposable synchronically and diachronically into two coordinators, each underlying a morpheme. Greek *kai*, for instance, derives from **kati*, itself being a concatenation of $^\star k^we$ + **te* (Beekes 2010, 614, Boisacq 1916, 390).[6] Conversely, Indo-Iranian (IIr.) *uta* comprises of coordinator *u* + *ta* (<$^\star h_2(é)u$ + **te*); Gothic coordinators *jah* and *jau* result from **yo* + $^\star k^we$ and **yo* + $^\star h_2u$ respectively. We summarise this fact briefly:

(28) a. Ved. *utá*, Gr. *aute*, Lat. *aut* = $^\star h_2u$ + **-te*
b. Ved. *u ca* = $^\star h_2u$ + **-k*^{w}*e*
c. Goth. *jau* = **yó* + **-h*$_2$*u*
d. Hit. *takku*, OIr. *toch* = **tó* + **-k*^{w}*e*
e. **initial coordinators in IE** = $J^0 + \mu^0$

The initial coordinators in IE are generally decomposable into—and reconstructable only as—a pair of orthotone and enclitic coordinators. We take these halves to correspond to the two coordinate heads J^0 and μ^0 that we have independently motivated in the previous section using den Dikken's (2006) proposal.

We are now in a position to distinguish the three canonical word order types in IE coordination. In monosyndetic coordinations with enclitic particles, the external (first) coordi-

[6] The philological notation h_2 refers to the *a*-colouring laryngeal.

nand (μP) is silent. In coordinations headed by a linearly initial bimorphemic coordinator, the two coordinate morphemes are distributed between J^0 and the head of its complement, μ^0. This idea is summarised in (29) and (30) with the three types of coordinate construction; Classical Latin (*at*)*que* is taken as an example (∅ is a notation for phonological silence).

(29) **Peninitial (monomorphemic) coordinate configuration**

a. *Peninitial monosyndetic configuration*

$$\Big[\lfloor_{\mu P}\ \begin{matrix}\mu^0\\ |\\ que\end{matrix}\ \text{coord}_1\ \rceil\ \big[\ \begin{matrix}J^0\\ |\\ \emptyset\end{matrix}\ \lfloor_{\mu P}\ \begin{matrix}\mu^0\\ |\\ que\end{matrix}\ \text{coord}_2\ \rceil\big]\Big]$$

b. *Peninitial monosyndetic configuration*

$$\Big[\lfloor_{\mu P}\ \begin{matrix}\mu^0\\ |\\ \emptyset\end{matrix}\ \text{coord}_1\ \rceil\ \big[\ \begin{matrix}J^0\\ |\\ \emptyset\end{matrix}\ \lfloor_{\mu P}\ \begin{matrix}\mu^0\\ |\\ que\end{matrix}\ \text{coord}_2\ \rceil\big]\Big]$$

(30) **Initial (bimorphemic) coordinate configuration**

$$\Big[\lfloor_{\mu P}\ \begin{matrix}\mu^0\\ |\\ \emptyset\end{matrix}\ \text{coord}_1\ \rceil\ \big[\ \begin{matrix}J^0\\ |\\ at\end{matrix}\ \lfloor_{\mu P}\ \begin{matrix}\mu^0\\ |\\ que\end{matrix}\ \text{coord}_2\ \rceil\big]\Big]$$

The analysis of compound coordinators sketched in (29) and (30), where the morphological components of initial particles like Latin *at-que* or Sanskrit *u-tá* are spread between μ^0 and J^0, also lends itself to a diachronic analysis of the development of linear placement of coordinators in synchronic IE, which is uniformly head-initial.

The proposed analysis also makes an empirical prediction for IE. Our having assigned the lower μ-headed coordination structure a category status, we predict the independence of μP. Our decomposition analysis of coordination breaks &P down into categories of two kinds. While the higher J^0 is taken to join coordinate arguments, its substructural μP is, *ceteris paribus*, predicted to constitute an independent phrasal category. Given the generalisation on monomorphemic enclitic coordinators, now treated as μ^0s, we predict the b-series (peninitial monomorphemic) morphemes like Latin *que* to feature independently with non-conjunctive meaning, on par with Japanese (1). This is in fact what we find in all IE branches. Independent μPs are of four types: universal quantifier terms, polarity constructions, free-choice constructions and additive/focus constructions. The following minimal set of examples shows this.[7]

(31) Sic singillatim nostrum unus quis-**que** mouetur
so individually we one wh-μ moved
'So each of us is individually moved' (LATIN; Lucil. *sat.* 563)

(32) a. ⟨prát⟩īdáṃ víśvam modate yát [kíṃ-**ca**] pṛthivyā́mádhi
this world exults which [what-μ] world.F.ACC-upon

[7]For further discussion and greater empirical coverage, see Mitrović (in progress, ch. 3).

'This whole world exults *whatever* is upon the earth.'
(VEDIC SANSKRIT; *Ṛgveda*, 5.83.9[c])

b. na yasya [kaś- **ca**] tititarti māyā?
NEG whom.GEN [who.M.SG μ] able to overcome illusions.PL
'No one [=not *anyone*] can overcome that (=the Supreme Personality of Godhead's) illusory energy.' (CLASSICAL SANSKRIT; *Bhāgavatapurāṇa*, 8.5.30)

c. [cintayaṃś- **ca**] na paśyāmi bhavatāṃ prativaikṛtam
[thinking.PRES.PART μ] NEG see.1.SG you unto-offence.ACC
'*Even* after much thinking, I fail to see the injury I did unto you.'
(VEDIC & CLASSICAL SANSKRIT; *Māhabhārata*, 2.20.1)

(33) a. [þishvad **uh**] (...) gaggis.
[where μ] go.2.SG.PRES.ACT.IND
'*wherever* you go' (GOTHIC; *Codex Argenteus*, Mat. 8:19)

b. jah [hvaz **uh**] saei hausei waurda meina
and who.M.SG and *pro*.M.SG hear.3.SG.IND words.ACC.PL mine
'And *every* one that heareth these sayings of mine'
(GOTHIC; *Codex Argenteus*, Mat. 7:26)

(34) a. hi- [cá -**ċ**] -du
in.DAT [wh μ] place.DAT.SG.F
'in every place' (OLD IRISH; MF, 024c09)

b. [ce **ċ**] orr
[what μ] slay.3.M.SUBJ
'*whichever* he may slay.' (OLD IRISH; Anecd. II.63.14.H)

5. Conclusion

In this paper, we sketched an approach to individual coordination that proposes a language universal structure of which different pieces are pronounced. We showed that there is a distinction between J-type and μ-type languages. In the remaining pages we consider disjunction which in several languages involves our J and μ morphemes.

5.1 Disjunction: From Caucasian to Slavonic, Hittite & Tocharian

In this section, we extend our analysis of rich conjunction structure to disjunction. We propose that disjunction has a similar, but yet more complex structure than conjunction.

One semantic possibility to derive disjunction involving both μ and J is shown in (35). The addition of κ and MIN derive that the entire phrase denotes the minimal superset of the filters generated by *a* and *b*, which is the union of the two filters.

(35) MIN [[κ μ $\circlearrowleft_{\langle e,et\rangle}$ a] J [κ μ $\circlearrowleft_{\langle e,et\rangle}$ b]]

a. $[\![\kappa]\!]^{M,g,w} = \lambda Q^{\langle et,t\rangle}\lambda P^{\langle et,t\rangle} \,.\, Q \subseteq P$

b. $[\![\text{MIN}]\!]^{M,g,w} = \lambda R^{\langle ett,t\rangle} \,.\, \iota P^{\langle et,t\rangle} \,.\, \forall P'(R(P') = 1 \rightarrow P \subseteq P')$

NE Caucasian: Avar and Dargi The first piece of empirical evidence for composed disjunctive markers comes from Dargi (North-East Caucasian). Take first a disjunction of two negative clauses:

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

Just as in Avar, conjunction in Dargi also obtains polysyndetically using an enclitic *ra* μ particle:

(37) il.a-la buru **ra** yurğan **ra** ʿnala **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.' (DARGI, van der Berg 2004, 199)

Exclusive disjunction, on the other hand, features both μ and κ particles, as evidence in (38) shows.

(38) [[**ya ra** pilaw b-ir-eħe,] [**ya ra** nerğ b-ir-eħe]]
κ μ pilaf(ABS) N-do-FUT.1 (J) κ μ soup(ABS) N-do-FUT.1
('What shall we make for lunch?') 'Well make (either) pilaf or soup.'
(DARGI, van der Berg 2004, 203)

The same compositional pattern is found in Avar, which expresses exclusive disjunction using a composed morpheme expression, containing a κ particle *ya*, the same one as in Dargi, and the gi_{μ} particle.

(39) [[**ya gi** Sasha] [**ya gi** Vanya]]
κ μ S (J) κ μ V
'either Sasha or vanya.' (AVAR, Mukhtareva, p.c.)

Tocharian Tocharian uses, among other particles, a connective *pe*, which is found in additive and conjunctive uses (40-a). We take the disjunction marker *epe* as involving the additive μ-particle *pe* and a interrogative-related maker *e*.[8]

(40) TOCHARIAN:
a. mā empeles omskeṃsac mā **pe** tampewātsesac
not terrible.M.PL.OBL evil.M.PL.ALLT not and powerful.M.PL.ALLT
'Not for the terrible, the evil, and not for the powerful'
(TA, Puṇyavanta-Jātaka, 26^{b})

[8]We tentatively relate the Tocharian *e-* particle with the interrogative particle *ne*, which has been explored in Koller (2013).

b. ṣerśkana ñi aiścer ce pintwāt
sisters.F.PL.VOC me give.Q.PRES.PL.IX these.M.OBL.SG alms.M.OBL.SG
e-pe se ññissa śpālmeṃ tākaṃ cwi
κ-μ who.M.SG.NOM than me better be.3.PL.SUBJ him.M.SG.GEN
aiścer
give.PL.PR.IX
'Sisters, will you give me these alms or will you give (them) to him who would be better than me?' (TB, *THT*, 107.18)

Old Church Slavonic Much clearer evidence comes from Old Church Slavonic (OC SLAV), which in fact survives in modern varieties of Slavonic, where the additive/conjunctive particle *i* (41-a) co-occurs with the interrogative (second position) marker *-li* to form a disjunction expression, *ili* (41).

(41) a. **i** dšǫ **i** tělo
μ soul (J) μ body
'body and soul' (OC SLAV; *Codex Marianus*, Mat. 10:28)
b. **i-li** otca **i-li** mater'
μ-κ father.ACC (J) μ-κ mother.ACC
'either father or mother' (OC SLAV; *Codex Marianus*, Mar. 7:10)

A clear morphosyntactic presence of the μ marker in disjunctive terms is also found in Old Irish, Homeric Greek and Hittite – and possibly a wider set of (Indo-European) languages, which we leave for further research.

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