# ECONOMY CONDITIONS ON INTERPRETATIONAL CHANGE

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ABSTRACT. This paper is couched within the the syntax-semantics mapping and investigates the structural (syntactic) conditions under which interpretational (semantic) change is sanctioned. In general, I provide an investigation into compositional semantic change, examining in particular the impact of semantic/pragmatic economy conditions on the application of exhaustification specifically and the compositional space more generally. The programmatic conclusion this paper reaches advocates a parametric approach to understanding interpretational change. Empirically, I address an intriguing case of semantic changes in the 'superparticle' system in Indo-European.

## 1 INTRODUCTION

This paper is couched within the the syntax-semantics mapping and investigates the structural (syntactic) conditions under which interpretational (semantic) change is sanctioned. In general, I provide an investigation into compositional semantic change, examining in particular the impact of semantic/pragmatic economy conditions on the application of exhaustification specifically and the compositional space more generally. The programmatic conclusion this paper reaches advocates a parametric approach to understanding interpretational change. Empirically, I address an intriguing case of semantic changes in the 'superparticle' system in Indo-European.

Natural languages display a surprising diversity of expression of elementary logical operations. The study of this variation is emerging as an important topic of not only cross-linguistic but also diachronic semantics.

While in modern English, words for expression of conjunction ('and'), universal quantification ('all'), additivity ('also'), or negative polarity and free-choice inferences ('any') clearly represent distinct morpho-semantic categories, two thirds of world's languages (Gil, 2011) express all such meanings using a uniform morpheme (or superparticles), which I dub $\mu$.

After buttressing the view that superparticle meanings are best captured in an alternative-based semantics and the covert system of exhaustification, I turn to the central question of deriving the taxonomy of $\mu$-encoded meanings. The aim being a diachronic theory of evolution of $\mu$-meanings.

In this section, I first review some formal foundations of diachronic semantics of logical meanings (∫1.1), before stating my desiderata in ∫1.2 and an overview of the organisation of the paper in ∫**??**.

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## 1.1 GRAMMATICALISATION OF LOGICAL ATOMS

Before we turn to the IE data and the empirical discussion, we devote the remainder of this section to a preliminary formal semantic theorisation on semantic change and tying it to minimalist models of syntactic chnage.

Grammaticalisation is generally understood as the diachronic process of changing lexical material into functional material. The notion has, wrongly, been associated or indeed equated with the concept of 'semantic bleaching', i.e. *loss* of semantic content.[1] As von Fintel (1995) shows, this does not hold. In what follows, we mainly draw from his (1995) work.[2]

The notion of 'semantic bleaching', with respect to grammaticalisation, seems to have been invented by non-semanticists to account for the meaningless functional units such as case markers but their seeming 'meaninglessness', which is by no means as factual as is promoted to be, is an exception in the realm of functional items. Or, as von Fintel (1995: 177–178) writes, "[f]or most other functional morphemes, the view that they have no meaning is *entirely mistaken*. [emphasis his] The semantics of determiners, modals, tenses, aspects etc. is after all the bread and butter of working semanticists. If there is a semantic reflex of the functional/lexical distinction, it is not that functional items are vacuous."

Applying these reformalised ideas about grammaticalisation to our empirical set, we have to concede that we are dealing with a case of grammaticalisation which is not of the plain-vanilla variety, under which it is maintained that the semantic change is that from lexical to functional meaning, but rather that we are dealing with second-order gramamticalisation, since our attention is on inherently functional meanings of language—those meanings characterised by high types and permutation invariance—that change into other—more?—functional meanings. In literature, this form of grammaticalisation is also known as secondary grammaticalisation and has been recognised, at least, ever since Kuryłowicz (1965): "Grammaticalization consists in the increase of the range of a morpheme advancing from a lexical to a grammatical or from a less grammatical to a more grammatical status, e.g. from a derivative formant to an inflectional one." (Kuryłowicz, 1965: 69) For an overview of theoretical developments in the field of grammaticalisation, see Hopper (1996) and for recent advances in the area of secondary grammaticalisation, see Traugott (2002), Breban (2015) and references therein. We will not revolutionise much with respect to this question but will simply pick up on, and expand, the idea that functional, as opposed to lexical, meanings have high types, as most notably argued in Chierchia (1984) and Partee (1987), among others (see Fintel 1995 for further reference and discussion).

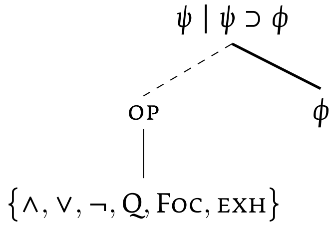
We follow von Fintel (1995) in assuming that permutation invariance and high types go hand in hand. Permutation invariance is elegantly situated within Carlson's (1983) theory, in which functional items—at least those that concern us in this thesis, namely logical words like coordinators, quantifiers, and possibly focus, (generalised/Chierchian) exhaustification and question markers—are endocentric. The notion of endocentricity entails

1 See, for instance, Sweetser (1988) and the numerous references therein. I do, however, concede that this notion is also quite an outdated view within mainstream grammaticalisation. For a more recent rectification of grammaticalisation, see Eckardt (2006, 2007, 2011) and references therein.

2 For a case-based account of semantic change, see Eckardt (2006) and references therein.

two beneficial effects, both in syntax as well as semantics. Syntactically, a Carlsonian 'endocentric' functional element does not change the category of its argument(s) (we have also been using the term host(s), which is of equal status in this respect). Among such endocentric elements are sentence modifiers, such as negation markers, which, as von Fintel (1995: 182) notes, take sentences and return sentences, without changing the category of their arguments (hosts). We could add to this set of endocentric elements markers of coordination, quantification, and interrogativity—these can uniformly be identified as logical terms. We can conjecturally add to the list of endocentric logical markers also the focus-sensitive and exhaustification operators. We maintain that syntactically, endocentric elements do not change the categories of their hosts.[3]

(1)




Functional meanings therefore have the following properties as von Fintel (1995: 183) lists them, where we select from his list:

(2) a. Functional meaning are permutation-invariant
b. Functional meanings have high types.
c. There are universal semantic constrains on possible functional meanings (conservativity).

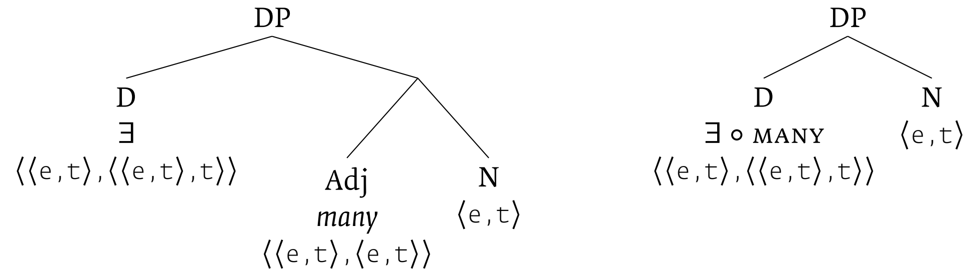
We will mostly concern ourselves with (2a–2b). Although von Fintel (1995) does not state it explicity but only states that "an item that becomes a functional morpheme has to assume a higher type", we take the following generalisation on the semantic change involved in grammaticalisation to hold:

(3) GRAMMATICALISATION GENERALISATION OF TYPES:
Grammaticalisation never results in type-lowering.

One instance to which (3) applies is the change from adjectival to determiner-like quantificational meaning that Fintel (1995: 185, ex. 14) reports, where the notion of function composition ($\circ$) is employed as the central tool of grammaticalisation.

(4) a. Stage 1: Adjective$_{\langle\langle e,t\rangle,\langle e,t\rangle\rangle}$ $\xrightarrow{t}$ b. Stage 2: Determiner$_{\langle\langle e,t\rangle,\langle\langle e,t\rangle,t\rangle\rangle}$

3 Fintel (1995) notices a caveat lurking behind the innocence of endocentricity, namely the fact that from a modern Minimalist point of view, the negative head is assumed to head its own projection, NegP, which defeats the 'no tampering' notion of endocentric operators. Fintel (1995) also finds a way to resolve this problem by appealing to the model of 'extended projection' proposed by Grimshaw (2000, 2005), which allows us to maintain that functional morphemes are both endocentric and exocentric elements simultaneously, as explored by Cormack and Breheny (1994).




If grammaticalisation truly relies on function composition of the denotations of syntactic elements, then the generalisation in (3) follows straightforwardly.

These semantic considerations on interpretational change can also be programatically integrated with morphosyntactic aspects of language change, more specifically, with the minimalist diachronic system of Roberts and Roussou (2003).

After surveying a rich collection of cross-lingusitic constructions, Roberts and Roussou (2003: 212) find a signature common denominator in diachronic syntax in loss of movement and a new exponence of a structurally higher functional head. The structural height, at least within a given spine, can generally be tied to the type-lifting notion motivated above (3). This head that is formed corresponds to the target slot of movement from a previous stage. In general terms, a formerly lexical head 'turns into' a functional head occupying a structurally superior position, as sketched in (5).

(5) $[_{XP}\ Y + X\ [_{YP} \ldots t_Y \ldots]] \gg [_{XP}\ Y = X\ [_{YP} \ldots Y \ldots]]$
(Roberts and Roussou, 2003: 212, ex. 19)

Note that this general diachronic state of affairs in syntax corresponds with the diachronic semantic type-raising restructuring indicated in (4). In the meanings investigated here, I will propose a reanalysis of a nominal quantifier particle $\mu$ as a clausal Focus head, along the lines of (5).

### 1.2 DESIDERATA & BACKGROUND

Superparticles in coordinate constructions project a complex Junction structure, viz. JP (Mitrović, 2014; Mitrović and Sauerland, 2014, 2016; Szabolcsi, 2015). This JP was subjected to diachronic changes in the narrow syntax which, ultimately, restricted the compositional space in the semantics of superparticles. Diachronically, IE languages lost the distinction between marking conjunctions of type *e* and type *t* (Mitrović and Sauerland, 2016) – the latter won the competition with a single (con-) junction structure void of internal structure capable of expressing quantification and additivity. (I discuss this in ∫2.)

There are two main ideas, or theoretical theorems I now turn to discussing briefly.

The first stems from accepted and well considered assumptions surrounding the modular nature of grammar. Specifically, interpretation is determined by a homomorphism between an algebra of syntactic representations and an algebra of semantic objects. Assume, rather standardly, that those objects form a set (Chomsky, 1995), or conversely a partially ordered set and lattice. A seemingly trivial function $\phi$, then, is an order-preserving map between syntax and semantics:

(6) $\phi : \mathcal{T}_{\text{SYN}} \mapsto \mathcal{T}_{\text{SEM}}$
s. t. $\forall x, y \in \mathcal{T}[[x \leq_{\mathcal{T}_{\text{SYN}}} y] \Rightarrow \phi(x) \leq_{\mathcal{T}_{\text{SEM}}} \phi(y)]$

The second is that hierarchical syntactic structure applies "all the way down" (Halle and Marantz 1993, *int. al.*). ith the advent of decompositional schools of morphology, such as Distributed Morphology (Halle and Marantz, 1994; Embick and Noyer, 1999, 2001; Embick, 2010) (which I adopt), the demarcation of syntax and morphology, and the very notion of word and word boundary got blunted, and nearly eliminated. Formal semantics, however, has lagged behind such advances although it too necessarily relies on a precise morpho-syntactic structures it takes as its own compositional objects of enquiry.

Given the two ideas, we should re(in)state and dub *morphosemantics* as the line of enquiry that aims to bridge the field-internal gaps. While much of pragmatic business has not been backtracked to semantics, but recent work (Chierchia, 2013) has tied it closely to a syntactic reality, blurring the lines between that which is ungrammatical and that which is illogical. Independently, yet in parallel, work on the relation between morpho-syntactic structure and interpretation has resulted in an explicit statement, in which this paper is ideologically couched:

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

Recent work on the anatomy of quantifiers (Leu, 2009) and quantificational morphemes (Kratzer and Shimoyama 2002; Szabolcsi 2015; Mitrović and Sauerland 2016, *int. al.*) has implicitly, or explicitly, aligned itself with the programmatic thrust of (7) and this paper aims to contribute in this direction, also.

### 1.3 THE PLAN

The specific desiderata, and the structure of the paper, are the following. §2 first provides the empirical set that I am concerned with here, namely the superparticle system in Indo-European. One aim of this section is to reproduce arguments for a fine-grained structure for conjunction, which captures compositionally the layers which encode non-conjunctive meanings (NPIs, FCIs, unviersal quantifers, additives). After briefly demonstrating how, using two lexical entries for the two conjunction-building formatives, a range of superparticle and $\mu$-encoded meanings can be derived, I turn to the core diachronic section, §3. There, I examine the synchronic and diachronic facts regarding a small fragment of IE languages. First, a syntactic change will be shown to have resulted in a compositionally different type of universal quantification with the $\mu$-morpheme/quantifier having a fixed (Focus) position in the clausal spine. Evidence from Modern Greek is cited to support this view. The section then turns to deriving the $\mu$-marked meanings in line with more general principles, conditions, and constraints on interpretation. Ultimately, those constraints are programatically restated in form of parameters which I apply to the fragment of languages.

## 2 THE INDO-EUROPEAN SUPERPARTICLE SYSTEM

All old Indo-European (IE) languages had a 'superparticle' system, by virtue of which they were able to to express conjunction, focal additivity, negative polarity, free-choice inferences, and universal quantification using the same particle, as investigated in Mitrović (2014). Nearly all languages lost this system: in one language family, Slavonic, where the superparticle did not have the syntactic property of 'Wackernagel placment' retained the superparticle system and the question I address in the paper is this: How can a seemingly vacuous property of second-position placement be linked to the retention, and/or loss, of the range of meanings?

On a more general level, I address and conjecture some diachronic phases involved in the process of loss of the superparticle system. In the next subsection, I examine the first such phase. I then proceed to laying out a unifying semantics for the $\mu$ superparticle in ∫2.2. Once I demonstrate how the various obtain from a relatively single entry, ∫3 then addresses parametrisation of the meanings and a diachronic layout.

### 2.1 THE INDO-EUROPEAN $\mu$ AND THE GRAMMAR OF CONJUNCTION

Nearly all old IE languages boasted two types of conjunction expressions: one in which the conjunction particle was initially (or, in linear terms, medially) places, in the other type, the conjunction particle was pen-initially placed (or, in linear terms, in second-position). Klein (1985a, 1985b) has show for Ṛgvedic that the alternation between initial and peninitial placements of the coordinator patterns with the category of the coordinands, whereby the peninitial (enclitic) coordinators generally do not feature in conjunctions of clauses, while the initial conjunction do.[4] Consider a minimal pair:

(8) VEDIC SANSKRIT:

a.

| | | | | | | |
|---|---|---|---|---|---|---|
| मा | नो॑ | म॒हान्तं॑म् | उ॒त | मा | नो॑ | आर्भ॒कं |
| mā́ | no | mahā́ntam | **u-tá** | mā́ | no | arbhakám |
| not | us | great | J-$\mu$ | not | us | small |

'[Harm] not either the great or the small of us.' (Ṛ̣V, 6.1.11[ab])

b.

| | | | | | |
|---|---|---|---|---|---|
| वाय॒व् | इन्द्रं॑श् | च | चेतथः | सु॒ताना॑ं | वाजिनीवस् |
| vā́yav | īndraś | **ca** | cetathaḥ | sutā́nāṃ | vājinīvasū |
| Vayu | Indra | and | rush.2.DL | rich | strength-bestowing |

'Vayu and Indra, rich in spoil, rush (hither).' (Ṛ̣V, 1.002.5[a])

Apart from the Indic family, IE languages lost this double system of conjunction as the predominantly non-distributive nominal peninitial conjunction strategy was replaced by the initial (non-distributive) conjunction system. The same pattern in found in Latin (9). Diachronically, the peninitial marker *que* is lost with the initial *atque* and generally *et* becoming the predominantly single device for expressing conjunction.

(9) CLASSICAL LATIN:

4 This subsection thus reproduced the facts and arguments for an analysis from Mitrović (2014); Mitrović (2018).

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]' (Or. 1.VI.27-8)

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

Identical synchronic and diachronic pattern is found in Ancient Greek where the double system of coordination in Homeric (10) declines in the post-Homeric period.

(10) HOMERIC GREEK:

a. κεῖσ' εἶμι καὶ ἀντιόω πολέμοιο
keīs' eīmi **kaì** antiō polemoio
there go and meet battle
'Go thither, and confront the war.' (Il. M. 368)

b. ἀσπίδας εὐκύκλους λαισήϊά τε πτερόεντα.
aspidas eukuklous laisēia **te** pteroenta
shields round pelt and feathered
'The round shields and fluttering targets.' (Il. M. 426)

The enclitic series is generally and freely prone to reduplication in nominal (or at least non-propositional or non-clausal)contexts. As Gonda (1954) and Dunkel (1982) note, a peninitial connective like $^{\star}k^{w}e$ is traditionally reconstructed with a twofold syntax: both monosyndetic (X Y $^{\star}k^{w}e$) and bisyndetic, or indeed polysyndetic, (X $^{\star}k^{w}e$ Y $^{\star}k^{w}e$) constructions are freely available in early IE languages, as the following three pairs representatively show.

(11) VEDIC AND CLASSICAL SANSKRIT:

a. धर्मे च अर्थे च कामे च
dharme **ca** arthe **ca** kāme **ca**
dharma/law.LOC and commerce.LOC and pleasure.LOC and
मोक्षे च भरत ऋषभ यद् इह अस्ति तद्
mokṣe **ca** bharata ṛṣabha yad iha asti tad
liberation.LOC and Bharata giant which here is.3.SG that
अन्यत्र यद् न इह अस्ति न तत् क्वचित्
anyatra yad na iha asti na tat kvacit
elsewhere which not here is.3.SG not that anywhere
'Giant among Bharatas whatever is here on Law, and on commerce, and on pleasure, and on liberation is found elsewhere, but what is not here is nowhere else.' (Mbh. 1.56.34)

b. वा॒यव् इन्द्र॑श् च चेतथः सु॒ताना॑ं वाजिनीवसू
vā́yav īndraś **ca** cetathaḥ sutā́nāṃ vājinīvasū
Vayu Indra and rush.2.DL rich strength-bestowing
'Vayu and Indra, rich in spoil, rush (hither).'
(ṚV 1.002.5[a])

(12) HOMERIC GREEK:

a. ὃς ἤ̹δη τά τ ̔ ἐόντα τά τ ̔ ἐσσόμενα
os ede tá **te** eonta tá **te** essomena
which were (=know.PLUP) the and exist.PART the and exist.FUT
πρό τ ̔ ἐόντα
pró **te** eonta
before and exist.PART

‘That were, and that were to be, and that had been before.’ (Il. A. 70)

b. ἀσπίδας εὐκύκλος λαισήϊά τε πτερόεντα
aspidas eukuklous laisēia **te** pteroenta
shields round pelt and feathered

‘The round shields and fluttering targets.’ (Il. M. 426)

(13) CLASSICAL LATIN:

a. iam tum tendit **que** fovet **que**
already then pursue and favour and

‘Already then, she *both* pursued it *and* (also) favoured it.’ (Aen. 1.18)

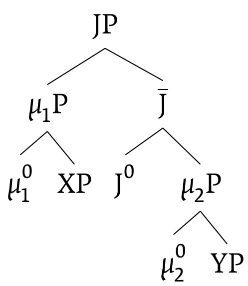
b. vīam samūtem **que**
life safety and

‘the life and safety’ (Or. 1.VI.28-9)

The polysyndetic pattern of enclitic coordinators express focus-associating ‘emphasis’ (anti/exhaustive inference, as I develop in the following section), akin to the modern English emphatic distributive conjunction with *both…and*.

Using internal, as well as independent, empirical evidence, the structure for conjunction that is motivated and proposed in Mitrović (2014); Mitrović (2018); Mitrović and Sauerland (2014, 2016) is the one in (14), which allows for (up to) three operators to be present in expression of distributive conjunction:

(14)




Based on (14), Mitrović (2014) distinguishes between three canonical word order types in IE conjunction, based on the previous data. In monosyndetic conjunctions with enclitic particles, the external (first) coordinand ($\mu$P) 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, $\mu^0$. This idea is implemented in (15) with the three types of coordinate construction; Classical Latin (*at*)*que* is taken as an example (o is a notation for phonological silence).

(15) a. PENINITIAL COORDINATE CONSTRUCTIONS

i. *Peninitial monosyndetic coordination* ( 12a, 13a, **??**):

$\big[[_{\mu P}\ \ \mu\ \ \text{coord}_1\,]\,[\ \ J^0\ [_{\mu P}\ \ \mu\ \ \text{coord}_2\,]]\big]$

(linked to: $\mu$ – *que*; $J^0$ – o; $\mu$ – *que*)

ii. *Peninitial monosyndetic coordination* (11b, 12b, 13b) with phonologically silent $\mu_2^0$:

$\big[[_{\mu P}\ \ \mu\ \text{coord}_1\,]\,[\ \ J^0\ [_{\mu P}\ \ \mu\ \ \text{coord}_2\,]]\big]$

(linked to: $\mu$ – o; $J^0$ – o; $\mu$ – *que*)

b. INITIAL (BIMORPHEMIC) COORDINATE CONSTRUCTIONS (8a, 10a, 9a) with phonologically silent $\mu_2^0$:

$\big[[_{\mu P}\ \ \mu\ \text{coord}_1\,]\,[\ \ J^0\ [_{\mu P}\ \ \mu\ \ \text{coord}_2\,]]\big]$

(linked to: $\mu$ – o; $J^0$ – *at*; $\mu$ – *que*)

The analysis put forth here also makes an empirical prediction for IE. Having assigned the lower $\mu$-headed coordination structure a category status, we predict the independence of $\mu$P. According to (14), the syntax of coordination is broken down into categories of two kinds. While the higher $J^0$ is taken to join coordinate arguments, its substructural $\mu$P is thus, *mutatis mutandis*, predicted to be an independent phrasal category. By virtue of being junctional, $J^0$ is dyadic and establishes a two-place relation between coordinands (a formal default of coordination expressions). $\mu$P, on the other hand, is monadic and does not establish a two-place coordinate relation (at least not in the sense that $J^0$ does), which leads us to the prediction that there are mono-argumental expressions which morphosyntactically feature the $\mu$ 'conjunction' particle. Given the generalisation on monomorphemic enclitic coordinators, now treated as $\mu^0$s, I now turn to citing the relevant data which establishe (14). Independent (monomorphemic and monadic/mono-argumental) $\mu$Ps in IE are essentially of four types: universal quantificational expressions, polarity sensitive expressions (NPIs), free-choice expressions (FCIs) and additive (anti-exhaustive) expressions. In the former three, $\mu$Ps comprise a $\mu^0$ superparticle and an indeterminate *wh*-element. Consider some evidence for this from a fragment of IE languages:

(16) SANSKRIT

a. FCI meaning:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| प्रती॒दं | विश्वं॑ | मोद॑ते॒ | यत् | किं | च | पृथि॒व्याम् | अधिं |
| prátīdáṃ | viśvam | modate | yát | [kīṃ | **ca**] | pṛthivyā́m | ádhi |
| this | world | exults | which | [what | $\mu$] | world.F.ACC | upon |

'This whole world exults **whatever** is upon the earth.'

(ṚV 5.83.9[a])

b. NPI meaning:

| | | | | | |
|---|---|---|---|---|---|
| न | यस्य | कश् | च | तितितर्ति | माया |
| na | yasya | [kaś | **ca**] | tititarti | māyā? |
| NEG | whom.GEN | [who.M.SG | $\mu$] | able to overcome | illusions.PL |

'No one [=not *anyone*] can overcome that (=the Supreme Personality of Godhead's) illusory energy.'

(BP. 8.5.30)

c. Additive meaning:

चिन्तयमः च न पश्यामि भवतां प्रति
[cintayaṃś- **ca**] na paśyāmi bhavatāṃ prati
thinking.PRES.PART μ NEG see.1.SG you unto
वैकृतम्
vaikṛtam
offence.ACC

'*Even* after much thinking, I fail to see the injury I did unto you.' (Mbh. 2.20.1)

(17) LATIN:

a. FCI meaning:

ut, in quo [quis-**que**] artificio excelleret, is in suo genere
that in who [what-μ] craft excels, is in his family
Roscius diceretur
R spoken

'so that he, in *whatever* craft he excels, is spoken of as a Roscius in his field of endeavor.' (Or. 1.28.130)

b. Universal quantifier meaning:

auent audire quid quis-**que** senserit
want hear what who-μ think

'they wish to hear what each man's opinion was' (Cic. *Phil.* 14,19)

(18) GOTHIC:

a. FCI meaning:

𐌸𐌹𐍃𐍈𐌰𐌳 𐌿𐌷 𐌲𐌰𐌲𐌲𐌹𐍃
[þishvad-**uh**] (...) gaggis.
[where-μ] go.2.SG.PRES.ACT.IND

'**wherever** you go' (CA. Mt. 8:19)

b. Universal quantifier meaning:

𐌾𐌰𐌷 𐍈𐌰𐌶 𐌿𐌷 𐍃𐌰𐌴𐌹 𐌷𐌰𐌿𐍃𐌴𐌹𐌸 𐍅𐌰𐌿𐍂𐌳𐌰
jah [hvaz-**uh**] saei hauseiþ waurda meina
and who.M.SG-μ *pro*.M.SG hear.3.SG.IND words.ACC.PL mine
𐌼𐌴𐌹𐌽𐌰

'And **every** one that heareth these sayings of mine' (CA. Mt. 7:26)

(19) OLD CHURCH SLAVONIC:

a. Additive meaning:

ⱂⱁⱄⱏⰾⰰ ⰹ ⱅⱁⰳⱁ ⰽⱏ ⱀⰹⰿⱏ
posŭla [**i** togo] kŭ nimŭ
sent.3.PL.AOR [μ him.M.SG.ACC] to then.PL.DAT

'He sent *also* him to them.' (CM. Mk. 12:6)

b. NPI meaning:

ⱀⰵ ⰿⱁⰳⰾⱏ ⰱⰻ ⱅⰲⱁⱃⰻⱅⰻ ⱀⰻⱍⰵⱄⱁⰶⰵ
ne moglŭ bi tvoriti [n-**i**-česo-že]
NEG be-able.PP would.3SG do [NEG-*μ*-what-REL]

'...he would not be able to do anything.' (CM. Jn. 9:33; Willis 2000: 328, ex. 15)

(20) CLASSICAL ARMENIAN:

a. NPI meaning:
եթէ ո ք
et'e [o-**k'**] ...
if who-*μ*

'If **anyone** [strike (thee) upon thy right cheek ...]'
(VT. Mat. 5.39; Klein 1997: 196)

(21) HITTITE:

a. Universal quantifier meaning:
𒉡 𒌉𒈨𒌍𒋗 𒆪𒅖𒊭 𒆪𒉿𒀜𒋫 𒌑𒌅𒉈 𒉺𒄿𒍣
nu DUMU.MEŠ-ŠU [kuišš-**a**] kuwatta utnē paizzi
J sons.his who-*μ* = ∀ somewhere country.LOC went

'**Each** of his sons went somewhere to a country.'
(KBo. 3.I.1.17–18)

b. Additive meaning:
D*ISTAR* URUŠamuha≈ma≈za GASAN≈*YA* apiya≈**ya** parā hantatar
Istar Samuha=but=REFL lady=my then=*μ* divine.providence
tikkussanu-[t]
show-3.SG.PST

'Then **too** Istar of Samuha, my lady, showed her divine power.'
(NH/NS (CTH 85.1.A) KBo 6.29+ obv. ii 29–30)

(22) OLD IRISH:

a. Universal quantifier meaning:
á huili duini .i. a ca-**ch** duini
voc all man i.e. voc wh-*μ*=every man

'O, all men i.e. O, **every** man' (Wb. 10c20)

b. FCI meaning:
[ce-**cha**] orr
[what-*μ*] slay.3.M.SUBJ

'**whichever** he may slay.'
(Anecd. II.63.14.H; Thurneysen 2003: 289)

What is evident, therefore, is that the enclitic distributive (nominal) conjunction particles were also able to associate with non-conjunctional meanings, such as forming NPIs, FCIs, universal quantifiers and additives. The remainder of this section is devoted to explicating the ways in which these different meanings obtain.

The *μ*-expressions built on *wh*-terms in Slavonic, for instance, are NPIs and never FCIs or unviersal quantifiers. In Hittite, those same types of constructions have a directly opposite distribution. Why is that? The following section addresses the nature of these taxonomies as the central concern of this paper.

### 2.2 THE UNIFYING MEANING OF $\mu$

The analysis I follow here requires two formative: a $\mu$ superparticle and a (possibly but not necessarily) abstract Junction operator/head $J^0$ which con/-joins $\mu$-phrases and delivers a conjunction, as per (14).

#### 2.2.1 ANTI/EXHAUSTIVE $\mu$

Lexical items, such as *any*, *-ever*, *all*, *also*, and *and* are morphologically marked in many languages with a uniform $\mu$ morpheme. Consider the range of $\mu$-meanings in modern Japanese:

This, in wider typological terms, aligns old IE languages with the modern Japanese system of $\mu$-meanings:

(23) The $\mu$-series (*mo*)

a. Bill **mo** Mary **mo**
   B $\mu$ M $\mu$
   '(**both**) Bill **and** Mary.'

b. Mary **mo**
   M $\mu$
   '**also** Mary'

c. dare **mo**
   who $\mu$
   '**every-/any-**one'

d. dono gakusei **mo**
   INDET student $\mu$
   '**every/any** student'

To unify the latter range of meanings, we assume that the semantic signature of $\mu$ is to bring into play active alternatives. That is, $\mu$ particle activates the alternatives of their hosts (structurally, complements, or at least sisters). The second function is independent of the intrinsic semantic makeup of $\mu$: the grammatical system then acts—following Chierchia (2013), has to act—on active alternatives by *exhaustifyng* (over) them via a silent operator EXH. The independence of the lexically specified obligation that $\mu$'s associates have active/adctivated alternatives from the presence of the EXH operator is marked in (24) with '$\rightsquigarrow$'. Extaustification, and alternatives generally, is assumed to be a proposition-level operation (see Chierchia 2013 and those he cites for details), hence the proposition-levelled definition of EXH in (24). EXHcombines with a proposition and negates all non-entailed and innocently excludable (♡) alternatives.[5]

(24) Lexical entry for $[\![\mu^0]\!]$:
$$[\![\mu]\!]([\![XP]\!]) = \{[\![XP]\!]\}^{\mathfrak{A}} \rightsquigarrow \textsc{exh}\Big(\{[\![XP]\!]\}^{\mathfrak{A}}\Big)([\![XP]\!]), \text{ where}$$
$$\textsc{exh}\big(\mathfrak{A}(p)\big)(p) = p \wedge \forall q \in \heartsuit\mathfrak{A}(p)[\neg q]$$

If the proposition involved negation, all its alternatives are entailed and none can be innocently excluded and negated. In this scenario, $\mu$ is a marker

5 We opt for a contradiction-free definition of EXH that relies on Innocent Exclusion (♡). See Alonso-Ovalle (2006), Fox (2007), among others, for details and discussion.

of negative-polarity. The insertion of a modal has a similar effect, but crucially, the relevant sub-domain alternatives ($\delta$) are pre-exhaustified in order to weaken the scalarity and yield a FC effect, as Chierchia (2013) assumes and suggests. The notion and nature of pre-exhaustified alternatives, which are central in Chierchia's (2013) system, can be recast in terms of recursive application of the EXH operator.[6] Therefore, assuming EXH is defined on a set of pre-exhaustified $\delta$-alternatives is the same as assuming that EXH applies iteratively, i.e., twice. We take the latter view, in line with Mitrović (2014); Mitrović and Sauerland (2014); Bowler (2014); Mitrović and Sauerland (2016). In case of FCIS, $\text{EXH}_{[\delta\mathfrak{A}]}$ *must* apply iteratively, and in case of NPIS, $\text{EXH}_{[\delta\mathfrak{A}]}$ *may not* apply twice. In a similar vein, we propose to derive the additive meaning of $\mu$: in unmodalised contexts, $\text{EXH}_{[\delta\mathfrak{A}]}$ applies iteratively to give an anti-exhaustive or additive meaning. This is the programmatic outline of a unification of $\mu$-marked meanings, sketched in (25). In the sections below, I explicate the details of the conditions on interpretation (hence the ellipses in the conditional clauses in 25), in both synchronic and programmatically diachronic terms.

(25) $$\text{EXH}_{[\delta\mathfrak{A}]}(p) = \begin{cases} \text{polarity reading} & \text{if under } \neg \ldots \\ \text{FC reading} & \text{if under } \diamond \ldots \\ \text{additive reading} & \text{if iterative EXH} \ldots \\ \bot & \text{otherwise} \end{cases}$$

How do we derive the final type of meaning, that is, the conjunctive one? By 'joining' two additives, for which we need another structural component, i.e. Junction.

### 2.2.2 PAIR-FORMING J(UNCTION)

Following previsous work (Slade, 2011; Mitrović, 2014; Szabolcsi, 2015), we take the J(unction) head to denote a neutral structural common denominator for conjunction and disjunction. Its role is to pair arguments up without stating whether the pair is conjoined or disjoined. We take J to be interpreted as a •-operator, In line with the bullet-definition of Winter (1996, 1995, 1998).

(26) Lexical entry for $[\![\text{J}^0]\!]$:
$[\![\text{J}^0]\!](\phi)(\psi) = \phi \bullet \psi = \langle \phi, \psi \rangle$

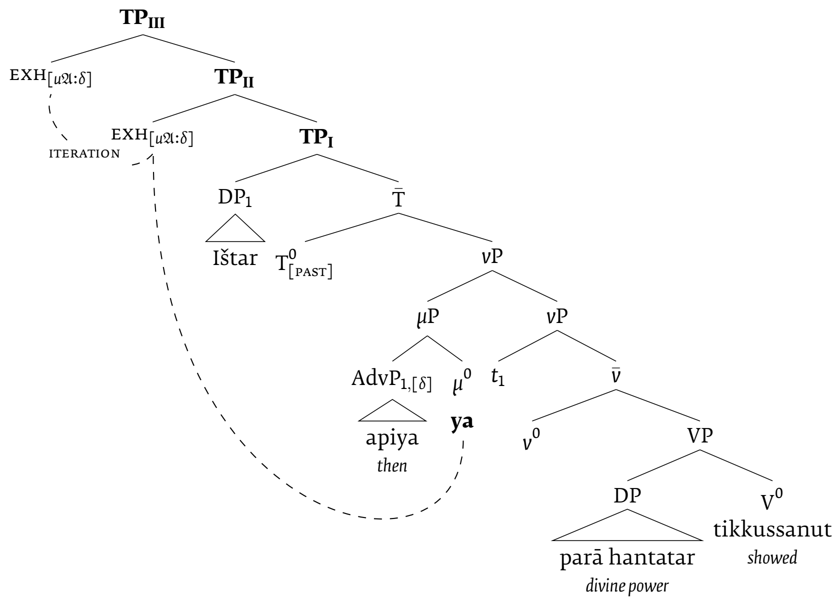
We further assume that, when the conjunctive meaning obtains when two additive $\mu$Ps are con-conjoined via J, post-suppositionally as per Brasoveanu and Szabolcsi (2013).

We assume that the distributive bisyndetic conjunction with the doubling of the *-(y)a* particle obtains from the Junction of two additive $\mu$-associating propositions, where *-(y)a* is the Hittite $\mu$.

(27) $^{D}$*ISTAR* $^{URU}$Šamuha≠ma≠za GASAN≠*YA* apiya≠**ya** parā hantatar
Istar Samuha=but=REFL lady=my then=$\mu$ divine.providence
tikkussanu-[t]
show-3.SG.PST
'Then **too** Istar of Samuha, my lady, showed her divine power.' (NH/NS (CTH 85.1.A) KBo 6.29+ obv. ii 29–30; Sideltsev 2017: 184, ex. 18)

6 See Fox (2007) for a discussion relevant for obtaining the Free-Choice meaning.

The basic meaning, which suffices for our demonstration of how the additivity obtains, is the proposition *p* that 'Istar showed (her) power then'.

(28)



(29) a. $[\![\mathbf{TP_I}]\!] \backslash [\![\mu^0]\!] = p(w) = \exists t \in \textsc{time}\big[\textsc{show}(\textit{Ištar})(\textit{her-power})(t)\big]$

i. $$\mathfrak{A}\Big([\![\mathbf{TP_I}]\!]\Big) = \left\{ \begin{array}{l} p(w) = \exists t \in \textsc{time}\big[\textsc{show}(\textit{Ištar})(\textit{her-power})(t)\big] \\ q(w) = \exists u \in \textsc{time}\big[\textsc{show}(\textit{Ištar})(\textit{her-power})(u)\big] \\ r(w) = \exists v \in \textsc{time}\big[\textsc{show}(\textit{Ištar})(\textit{her-power})(v)\big] \\ \vdots \end{array} \right\}$$

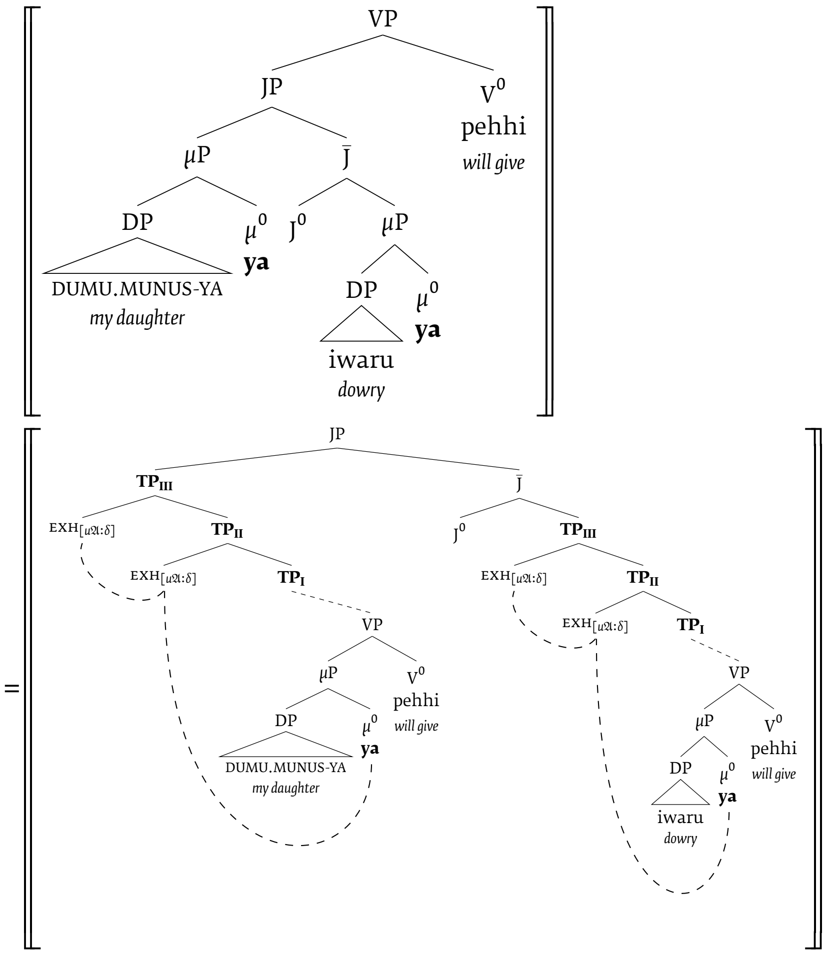
b. $$\begin{aligned} [\![\mathbf{TP_{II}}]\!] &= \textsc{exh}\big(\mathfrak{A}(p)\big)(p) \\ &= p \wedge \forall q \in \heartsuit\mathfrak{A}(p)[\neg q] \\ &= \exists t \in \textsc{time}\big[\textsc{show}(\textit{Ištar})(\textit{her-power})(t)\big] \\ &\quad \wedge \neg\exists u \in \textsc{time}\big[\textsc{show}(\textit{Ištar})(\textit{her-power})(u)\big] \\ &\quad \wedge \neg\exists v \in \textsc{time}\big[\textsc{show}(\textit{Ištar})(\textit{her-power})(v)\big] \wedge \cdots \end{aligned}$$

c. $$\begin{aligned} [\![\mathbf{TP_{III}}]\!] &= \textsc{exh}\big(\textsc{exh}(p)\big)\big)(p) \\ &= p \wedge \neg\textsc{exh}(p) \\ &= [\![\text{Ištar showed her powers then and not only then}]\!] \\ &= [\![\text{Ištar showed her powers also then}]\!] \end{aligned}$$

To see the post-suppositional composition of two additive *μ*Ps at play, consider a sentence in (30). We assume that each of the two *μ*-associating DPs are independently additive, as per (27) above.

(30) NH/NS 176, (CTH 176) KUB 21.38, letter to Ramses II)
DUMU.MUNUS-YA≈**ya** iwaru≈**ya** pehhi
daughter-my=*μ* dowry=*μ* give.1.SG
'I will give you **both** my daughter **and** the dowry.'

The structural presence of the J-projection 'joins' the two *μ*-containing phrases. We assume conjunction reduction of the coordinated objects, at least at the interpretational level (see Alonso-Ovalle 2006 for the relevant discussion, *int. al.*).

(31)



Since by the theoretical design of our assumptions regarding the structure of alternatives, we contend that (30) instantiates conjunction reduction with each $\mu$-conjunct constituting a proposition, assertion, and the corresponding set of (propositional) alternatives.[7]

As conjuncts, the $\mu$Ps in (30) are assumed to have the additive meanings as in (27). The existential presupposition that expressions with an additive particle, like $\mu$ in (27), express is contextually satisfied generally. In conjunction structures, we programmatically follow Brasoveanu and Szabolcsi (2013) who analyse the existential presupposition of additives dynamically in order to derive the additive requirement as a postsupposition (itself being a delayed update, in a dynamic sense). For our purposes, it suffices to adopt an account which will allow for each inherently additive conjunct to satisfy the other conjunct's additive/existential presupposition. We assume that under JP the exhaustive (or, alternative negating) conjunct in the meaning of the recursively exhaustified $\mu$P is interpreted as a postsupposition (notated with '$\smile$'). Given the additive meaning we derived above and the postulated lexical entry for $J^0$ (26), we derive in (32) the conjunction in (30). Take the first conjunct in (31) to be $p$, and the second conjunct $q$.

(32)
$$
\begin{aligned}
[\![(31)]\!] &= [\![J^0]\!]([\![\mu P_1]\!])([\![\mu P_2]\!]) \\
&= [\![\mu P_1]\!] \bullet [\![\mu P_2]\!] \\
&= \langle [\![\mu P_1]\!], [\![\mu P_2]\!] \rangle
\end{aligned}
$$

7 A cross-categorial version of EXH seems tenable but we do not pursue this theoretical avenue here.

$$= \langle [p \wedge \neg\text{EXH}(p)], [q \wedge \neg\text{EXH}(q)] \rangle$$
$$= [p \wedge \neg\text{EXH}(p)] \wedge [q \wedge \neg\text{EXH}(q)]$$
$$= [p \wedge \underbrace{\neg\text{EXH}(p)}] \wedge [q \wedge \underbrace{\neg\text{EXH}(q)}]$$
$$= p \wedge q \wedge \underbrace{\neg\text{EXH}(p)} \wedge \underbrace{\neg\text{EXH}(q)}$$
$$= p \wedge q$$

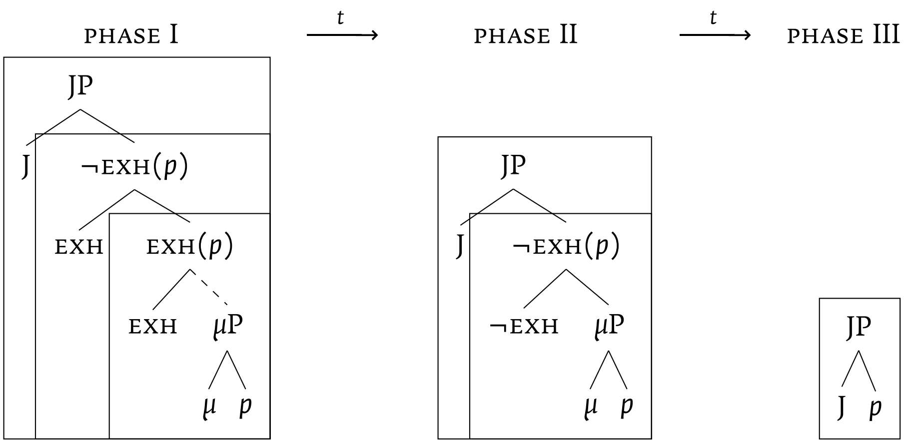
For a recent implementation in the same vein, see Szabolcsi (2017), among others.

## 3 CHANGE IN AND LOSS OF THE SUPERPARTICLE SYSTEM

In light of the proposed semantics for $\mu$ superparticles, I propose a working three-phase diachronic development of the superparticle-junction system. (I represent the con/junction of the internal con/junct only, for ease of exposition.)

Phase I structurally allowed for an entire range of meanings mentioned before. Crucially, and as I expound below in greater detail, iterative exhaustification (along with other semantic-pragmatic devices) was operative in order to deliver anti-exhaustive (and additive) meanings. In Phase II, such recursive exhaustification was reanalysed as anti-exhaustivity, without allowing for single layers of exhaustification to take place. In the last phase, exhaustification is no longer present in the $\mu$-expressions as $\mu$-markers disappear altogether and are replaced by clause-level conjunctions (as discussed briefly in ∫2.1 and elsewhere). In (33), this is schematised as loss of compositional structure.

(33)




In this paper, I focus predominantly on Phases I and II by investigating the principles and parameters relevant to interpretation and semantic change.

This section comes in three parts. In the first subsection, ∫3.1, I focus on one instance of syntactic change at phase II stage which restricted the space of possible interpretation of $\mu$-meanings.

### 3.1 THE GOTHIC PARADOX

This section introduces a structural/compositional grammaticalisation of the $\mu$ superparticle detectable in Gothic, and possibly holding in Old Irish, too. The inherited $\mu$-system from PIE, which was characterised by *e*-type contexts (in the sense of Mitrović and Sauerland 2016) and distributively nominal conjunction, was syntactically reanalysed as a C-category quantifier. This syntactic reanalysis, in which semantic changes are detectable, is dubbed the Gothic paradox.

The Gothic pattern suggests that nominal quantification takes place in the C-domain and that the nominal quantifier is a C-head. I will cite novel evidence from Modern Greek to support such an analysis.

### 3.1.1 GOTHIC

Gothic, like the majority of old IE languages, had a multi-tasking $\mu$ super-particle, *uh*, which expressed conjunction, free-choice and universal quantifier meaning. Gothic, however, does not allow for *e*-type conjunction, nor the predictable *e*-type additivity. Independent evidence suggest that *uh* has a fixed position within the clausal structure. Eythórsson (1995) and Ferraresi (2005), and those they cite, provide strong evidence for the Gothic *uh* instantiating a C head. (Walkden, 2014), in this vein, proposes the $Foc^0$ position for *uh*, whom I follow.

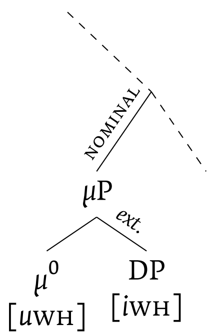
The empirical fact that *uh* is formative in building universal quantifiers and (universal) FCIs, yields a syntactically structural and semantically compositional paradox:

(34) THE GOTHIC PARADOX
Gothic *uh* instantiates clausal $Foc^0$. The *uh* particle also forms universal quantifiers and FCIs which have inherently nominal character. How can *uh* be both nominal (*e*-type) and clausal (*t*-type) simultaneously?

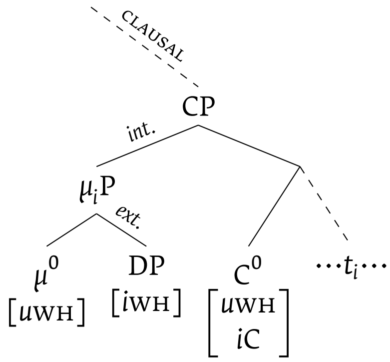
Gothic (along with Old Irish, which I do not investigate here), instantiates the $\mu$ particle in the C-system (Eythórsson, 1995; Ferraresi, 2005; Walkden, 2014) which I take as an instance of structural reanalysis. My analysis is the following. The $\mu$-associates in non-additive expressions are *wh*-phrases. In Minimalist terms (Chomsky, 1995), the relevant uninterpretable *wh*-feature gets reanalysed to structural contexts which feature [*u*WH], namely a functional C-feature. This also has a result the change between externally and internally merging the *wh*-associate DP, as well as the quantificational difference in first combining with the nucleus and secondly with the restrictor.

(35) (a) ⟶ (b) ⟶ (c)

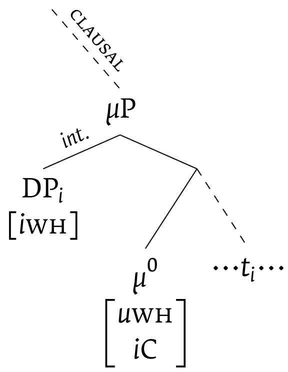
a.



b.




c.



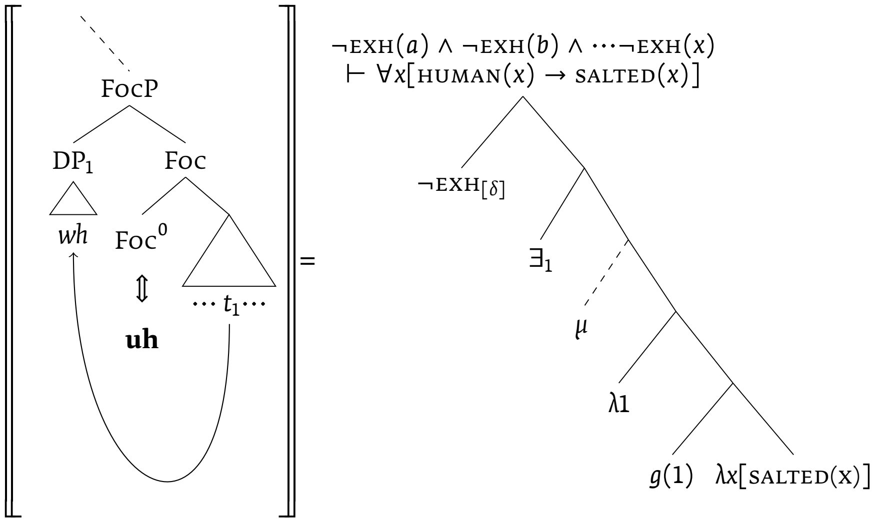

This type of syntactic reanalysis is in line with the templatic diachronic theory given in (5). Let me now turn to the synchronic aspects of the diachronic result (35). Consider the two $\mu$-meanings of *uh* from Matthew below:

(36) [hvaz -uh] auk funin saltada
who $\mu$ ADV fire.DAT.SG.N salted.3.SG.PASS
'**everyone** will be salted with fire'

(37) [þishvad **uh**] (…) gaggis
where $\mu$ go.2.SG.PRES.ACT.IND
'**wherever** you go' (CA. Mt. 8:19)

In light of the evidence for a clausal position of *uh* and the semantic evidence for quantificational meanings encoded in that position, as given in (36–37) above, the Gothic paradox (34) stands. I propose the resolution along the following lines: the *uh* particle gives the effect of a universal quantifier (via obligatorily recursive application of EXH). The core compositional difference, arising as an innovation, is the following. As a nominal quantifier inherently positioned in the clausal spine, *uh* first composes with the nucleus (its sister) and then with its restrictor, *wh*-phrase in Spec(FocP). Consider the structure and interpretation of (36) given below (ignoring the contribution of future tense for simplicity). In line with the view that Gothic is a Phase II language (33), the exhaustification is taken to be recursive as a matter of rule.

(38)




### 3.1.2 MODERN GREEK

Related evidence comes from Modern Greek and the particle *ke*. Aside from conjunction, Modern Greek *ke* is bisyndetically distributive, showing *e*-type flavours, like the Slavonic *i* particle. Predictably, *ke* also has non-junctional meanings: the additive one, as well as a FCI-forming one. In all non-junctional expressions, *ke* is in a fixed clausal position. I take this position to be $\text{Foc}^0$. Modern Greek *ke* thus has the same distribution as the Gothic *uh* particle, modulo the availability of expression of universal quantifier meaning.

(39) Mu arési **ke** o Aristotélis.
me liked also/$\mu$ the Aristotle
'I like **also** Aristotle.'

(40) Mu arési **ke** o Plátonas **ke** o Aristotélis.
me liked both/$\mu$ the Plato both/$\mu$ the Aristotle
'I like **both** Plato **and** Aristotle.'

(41) **Ópjos ke** ∗(na) to ékane, ine akóma edó
who and/$\mu$ sbj it did is still here
'**Whoever** did it, is still here.

Modern Greek *ke* has the three meanings, additivity (39), distributive conjunction (40), and FC 41, which uniformly derive from the proposed anti-exhaustive meaning, characterised by Phase II in (33). Another aspect, which I do not explore in detail here, is that the subtrigging effect derives syntactically from the analysis of the FC-morpheme being statically placed in a clausal position. It has been known, at least since Dayal (1995), that FC inferences are licensed in episodic non-modal contexts in presence of a subtrigging relative clause. Such a relative clause is, on the structural account I put forth here, a realisation of the clausal spine which hosts the FC $\mu$-morpheme like Modern Greek *ke*.[8]

How is Modern Greek *ke* different from the Gothic *uh* particle in disallowing universal quantifiers? The main property that discriminates between

8 A similar analysis seems extendable for English, udne the assumption that the FC-morpheme *-ever* instantiates a clausal $\text{Foc}^0$ head. While this seems to be on a track which can handle some outstanding issues (Hirsch, 2016: 357), I leave this aside.

the two types of meanings is, informally, licensing restriction to modalised contexts. In this regard, I propose that the discriminating factor is the Fluctuation Constraint Dayal (2009).[9]

(42) THE FLUCTUATION CONSTRAINT (Dayal, 2009: 241, 5b)
$\neg\exists X \forall w'[w_a \leq w']\lambda x[P(w')(x) \wedge Q(w')(x)] = X$

The grammaticalisation of a FC-marker in the C-system guarantees Fluctuation and the wide-scope of $\mu$, as I discuss below.

### 3.2 DERIVING SUPERPARTICLE MEANINGS

I am now in a position to account for the core types of superparticle meanings synchronically. What is more, this will allow me to propose a diachronic model of interpretational change between these types and various historical stages in IE.

Consider four languages, each representative of the semantic type of the set of $\mu$-meanings. Conjunction is left out since it is shared by all four.

| | | $\mu$-ENCODED MEANINGS | | | |
|---|---|---|---|---|---|
| | | ∀ | FCI | NPI | ADD |
| A | Sanskrit | – | + | + | + |
| B | Slavonic | – | – | + | + |
| C | Gothic | + | + | – | – |
| D | Modern Greek | – | + | – | + |
| E | Hittite | + | + | – | + |
| F | Modern Japanese | + | + | + | + |

TABLE 1: *A typology of $\mu$-encoded meanings parametrically.*

One desideratum is the derivation of a systematic account for the distribution and variation in the table above. The second desideratum is a diachronic model of the synchronic parameters.

I now take the $\mu$-marked meanings in turn to motivate a synchronic parametrisation.

#### 3.2.1 POLARITY SENSITIVITY

My proposal which assumes iterative exhaustification as the device that delivers FCIs, additives, and universals, is based on an economy consideration. EXH will iterate only when it has to, everything else being equal. Crucially, NPIs, as $\mu$-marked *wh*-indefinites in the scope of negation provide non-trivial contexts in which a single mode of exhaustification is not only successfully meaningful but also economically preferred. This is in line with Chierchia's (2013) Blocking condition (where '>' is an economy preference symbol), given in (43).[10]

9 See also the discussion in Chierchia (2013: 310ff.), who provides a modified definition of Fluctuation; his variant does not have bearing on my purposes here

10 The blocking condition is that of Chierchia (2013: 278, 57) but the notion of pre-exhaustivised alternatives is encoded, as an instance of recursive sub-domain exhaustification ($\text{EXH}^2_\delta$), as discussed above.

(43) BLOCKING: LAST RESORT EXH-RECURSION
$\text{EXH}_{\delta}[\ \text{NEG} \cdots \text{DP}_{\delta} \cdots] \;>\; \text{EXH}^{2}_{\delta}[\ \text{NEG} \cdots \text{DP}_{\delta} \cdots]$

Assume now a historical change where the 'last resort' recursive exhaustification (43) become a default 'first response' mode of interpretation. Phase II languages (33), such as Gothic or Modern Greek, encode anti-exhaustivity as a 'first response' mode. Such languages are predicted not to be able to encode polarity sensitivity, which requires a single layer of exhaustification. Given the distribution to Downward Entailing contexts, the iterativity as a rescue operation is blocked. In what follows, I advocate another presuppositional condition which distinguishes NPIs from other meanings.

There is another property that distinguishes NPIs from other meanings. The difference between $\mu$-marked NPIs and other $\mu$-marked indeterminate (*wh*-phrase) expressions can be derived using a semantic and a syntactic parameter. The former is Chierchia's (2013) 'Proper Strengthening' (PS) parameter (44). The latter is a featural requirement on $\mu$ for there to be restricted to Downward Entailing contexts (which can be achieved using a Minimalist checking theory). In this paper, I focus on the semantic parameter.

(44) THE PROPER STRENGTHENING PARAMETER (Chierchia, 2013: 274, 48)

$$\text{EXH}^{\text{PS}}_{\mathfrak{A}}(\phi) \begin{cases} \text{EXH}_{\mathfrak{A}}(\phi) & \text{if } [\text{EXH}_{\mathfrak{A}}(\phi) \subset \phi] \\ \bot & \text{otherwise} \end{cases}$$

Since $\text{EXH}^{\text{PS}}$ is a presuppositional operator, this allows us to capture the parameter: either EXH is presuppositional, in the sense of PS (44), or it is not. If it is, EXH (recursive or not) is required to yield a meaning which is informationally stronger than the assertion. If it is not, non-stronger meanings pass. This derives the distribution of NPIs.[11]

### 3.2.2 UNIVERSAL QUANTIFICATION

Another $\mu$-meaning is that of universal quantification, as instantiated in Gothic (structurally in the C-domain) or Hittite (structurally in the nominal domain). What captures the meaning of a universal quantifier is a iterative sub-domain ($\delta$-level) exhaustification. Note that this way of obtaining universal quantification via iterative application of EXH does not violate Chierchia's (2013) naturally defined exhaustification economy:

(45) EXHAUSTIFICATION ECONOMY (Chierchia, 2013: 129, ex. 75)
Avoid unnecessary exhaustification.

a. $*\text{EXH}_{\text{A}}\,[_{\text{Y}} \cdots \text{X}_{[+\text{A}]} \cdots]$, if the result is itself a member of $[\![\text{Y}]\!]^{\mathfrak{A}}$ different from $[\![\text{X}]\!]$.
b. $*\text{EXH}_{\text{A}}\,[_{\text{Y}} \cdots \text{X}_{[+\text{A}]} \cdots]$, if logically equivalent to $[_{\text{Y}} \cdots \text{X}_{[-\text{A}]} \cdots]$.

The way in which the proposed derivation of universals in Gothic or Hittite proceeds abides by the economy principle in (33), despite the over-generation problem of FC-effect that Chierchia (2013: 122, fn. 30) warrants against. Recursive exhaustification over the domain of non-scalar alternatives does not violate (33), as shown in (46), taken from Chierchia.

11 As well as various kinds of FCIs contrasting in quantificational force), such as the German *irgend*-type versus the Italian *qualunque*-type of FCIs, as Chierchia (2013: 275ff.) discusses in detail.

(46) $\text{EXH}^2_\delta([p \vee q]) = [p \vee q] \wedge \neg\text{EXH}(p) \wedge \neg\text{EXH}(q)$
$= [p \vee q] \wedge \neg(p \wedge \neg q) \wedge \neg(q \wedge \neg p)$
$= [p \vee q] \wedge (p \rightarrow q) \wedge (q \rightarrow p)$
$= p \wedge q$

### 3.2.3 FREEDOM OF CHOICE

Universal FCIs require wide-scope (more on that below) and, while they derive via iterative sub-domain exhaustification just like distributive universal quantifiers, they have additional characteristic, namely being constrained by Fluctuation (42). I take Fluctuation to be a privative character of (universal) FCIs.

Therefore, FCIs share with universal quantifiers the iterative mode of being derived, to the exclusion of NPIs (cf. 43), which also do not satisfy the PS condition (44).

The last meaning I sketch is that of standard additivity, which shares technical character with related meanings but differs in more morphosyntactically detectable aspects.

### 3.2.4 ADDITIVITY

How are additive meanings technically different from other *μ*-meanings? I now turn to explicating the commonalities and differences. The main difference can be stated in purely syntactic terms: *μ*-encoded meanings of universals, FCIs, and NPIs arise when the *μ*-associate is a *wh*-phrase. Additives arise as an elsewhere option on *μ*-associating (complementation).

This same distribution can also be captured semantically by cashing in on the existential quantifier meaning of *wh*-phrases, which is what I assume (see Xiang (2016) and those she cites for evidence). A proper noun like 'John' has no hardwired existential meaning: therefore, when *μ* associates with 'John' it will trigger its alternatives and recursive exhaustification takes place (see Mitrović and Sauerland 2016 for details) to yield an anti-exhaustive, or additive, meaning. Additive expressions of *wh*-phrases are therefore predicted to be impossible *μ*-meanings.

(47) * Znam i ko i kako je napravio zadaću
know.1.SG *μ* who *μ* how AUX.3.SG made homework
'I know both who and how one did the homework.'

The differentiating property of additives is therefore the restriction to non-*wh*-associates, which can be modelled semantically as a possible restriction on type-association (*e*-type versus types higher than *e*), or a restriction on association with existential quantifiers (assuming *wh*-phrases are, indeed, existential quantifiers). I adopt a lighter take here, assuming that the differentiating property is that of 'indeterminacy' (in the sense of Shimoyama 2006: while *wh*-phrases are indeterminate, proper DPs, such as 'John' are not.

## 3.3 SUPERPARTICLE PARAMETERS

I define here the parameters I described as conditions or contraints in the previous subsections.

The first concerns the Gothic-type clausal position of the $\mu$-particle and is stated in more syntactically relevant terms in (48). The first parameter is stated in three interlocking forms:

(48) THE TYPE-COMPOSITIONAL PARAMETER
Is $\mu$ an *e*-type operator? Does the $\mu$-associate merge externally? Is the WSC grammatic(al)ised?
  a. YES. Slavonic, Sanskrit, Japanese, type A, B, F.
  b. NO. Gothic, type C.

The second parameter regulates the distribution and general availability of polarity sensitivity in a given language. We state this as a question form of Chierchia's (2013) PS:

(49) THE PROPER STRENGTHENING (ANTI-NEGATIVITY) PARAMETER
Does the exhaustification of $\mu$-triggered alternatives need to satisfy PS?
  a. YES. Gothic, Modern Greek, , types C, D
  b. NO. Sanskrit, Slavonic, types A, B

The parameter which, independently of PS, derives the taxonomy of NPIs and other $\mu$-marked meanings regards the nature of iterative application of EXH, which is given in (50).

(50) THE ECONOMICAL ITERATIVITY PARAMETER
Does EXH iterate only when it has to? ('Last resort' *vs* 'First response')
  a. YES. Slavonic, type B.
  b. NO. Gothic, type C. (Iterativity as structural allosemy, when J is projected)

The last parameter, which I state as two sub-parameters, concerns the $\mu$-formation of FCIs in a languages. The relevant property hinges on Dayal's (2009) notion of Fluctuation. The first sub-parameter (51i) is stated as a 'first response' set of options which exclude the availibity of NPI encoding. The second sub-parameter (51ii), however, allows for non-FCI meanings to be encoded also.

(51) i. THE FLUCTUATION PARAMETER
Does the context in which $\mu$ features have to fluctuate?
    a. YES. Greek, type D.
    b. NO. Slavonic, type B.
  ii. Can the context in which $\mu$ features fluctuate?
    a. YES. Sanskrit, Japanese, type A, F.
    b. NO. Slavonic, type B.

Presumably independent syntactic parameters on the various kinds of $\mu$-superparticles concern their featural specifications which, in tandem with the three semantic parameters, yield the distributions we observe. One such syntactic factor was the demonstrated structural reanalysis of $\mu$ in Gothic (and probably Celtic) which developed into a C-type Focus head, as motivated above.

In Tab. 2, I take a small of languages, each representative of a typological set of $\mu$-meanings (cf. Tab. 1) as well as different stages of IE. (I include Japanese for comparative purposes). Each of the parameters and properties discussed above is set in a two-dimension table in order to plot the discrete interpretational parametrs to interact with one another and yield the relevant taxonomies (e.g., Slavonic versus Gothic, etc.).

—intro text on the Big table to follow.—

TABLE 2: *My caption. Legend of meanings:* N*–NPI,* F*–FCI,* Q*–Universal Quantifier,* A*–Additive. Legend of languages: Sl–Slavonic, Sk–Sanskrit, Gt–Gothic, Ht–Hittite, mG–Modern Greek, Jp–Japanese (modern)*

| | | ETYP | | PS | | FLUC | | ITER | | INDT | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | + | – | + | – | + | – | + | – | + | – |
| ETYP | + | | | Jp Q F | Gt Q F | Sk N | Ht, Jp Q | Jp Q | | Jp Q | |
| | – | | | Sl, Sk N | | mG F | | Gt Q | | | |
| PS | + | Jp Q F | | | | F | Jp Q | Jp, Gt Q | | Jp Q F | A |
| | – | Sk, Sl N | | | | | Jp, Sl, Sk N | | Jp N | Sk, Sl N | |
| FLUC | + | Sk F | mG F | Jp F | (N) | | | Jp F | | Sk, Gt F | (A) |
| | – | Ht, Jp Q | | Jp, Gt Q | N | | | Gt Q | | Sk, Gt F | A |
| ITER | + | Jp Q | Gt Q | Jp, Gt Q | | Jp F | Gt Q | | | Jp Q | A |
| | – | | | | | | | | | Jp N | |
| INDT | + | Jp Q | | Jp Q F | N | Sk, Gt F | Jp, Gt Q | Q | | | |
| | – | | | A | | A | | A | | | |

CLAUSAL $\mu$ AND POLARITY-INSENSITIVITY The clausal placement of $\mu$ in Gothic in Modern Greek also patterns with the absence of polar-sensitive meaning. Here, I briefly conjecture on how the two properties, clausal placement and non-polar meaning, may be related.

While a universal FCI is characterised by a wide scope, an NPI is not. In IE, $\mu$-marked FCIs are generally overtly placed in the clausal left edge, and Gothic shows a inherently clausal position for that wide scope. Aside from, or in line with, the featural reanalysis (35), I propose that the Wide-Scope Constraint (52) was a propelling factor in that reanalysis.

(52) THE WIDE-SCOPE CONSTRAINT (WSC) (Chierchia, 2013: 316, 25)
[ FCI NP MODAL ] > [ MODAL FCI NP ]

This, as Chierchia (2013) demonstrates, derives Dayal's (2009) Fluctuation Constraint (42). Since NPIs do not have to abide by the WSC, the polar sensitive meaning of $\mu$ was lost upon grammaticalisation of the WSC along the lines of (35). This derives the facts observable in Gothic, Old Irish and, indeed, Modern Greek.

## 4 CONCLUSIONS & OUTLOOK

Building on novel investigations into the historical linguistic of algebraic $\mu$-expressions, this paper has proposed that the semantic oscillations and eventual shifts between technically related meanings can be understood in terms of economy conditions.

These economy conditions were principles and/or constrains independently proposed to account for some micro-typologies of polarity-sensitive and scalar expressions (Chierchia, 2013). I invoked five of them in the working parametrisation system.

(53) a. the fluctuation constraint (FLUC)

b. the *e*-type/structural constraint (ETYP)

c. the proper strengthening parameter/constraint (PS)

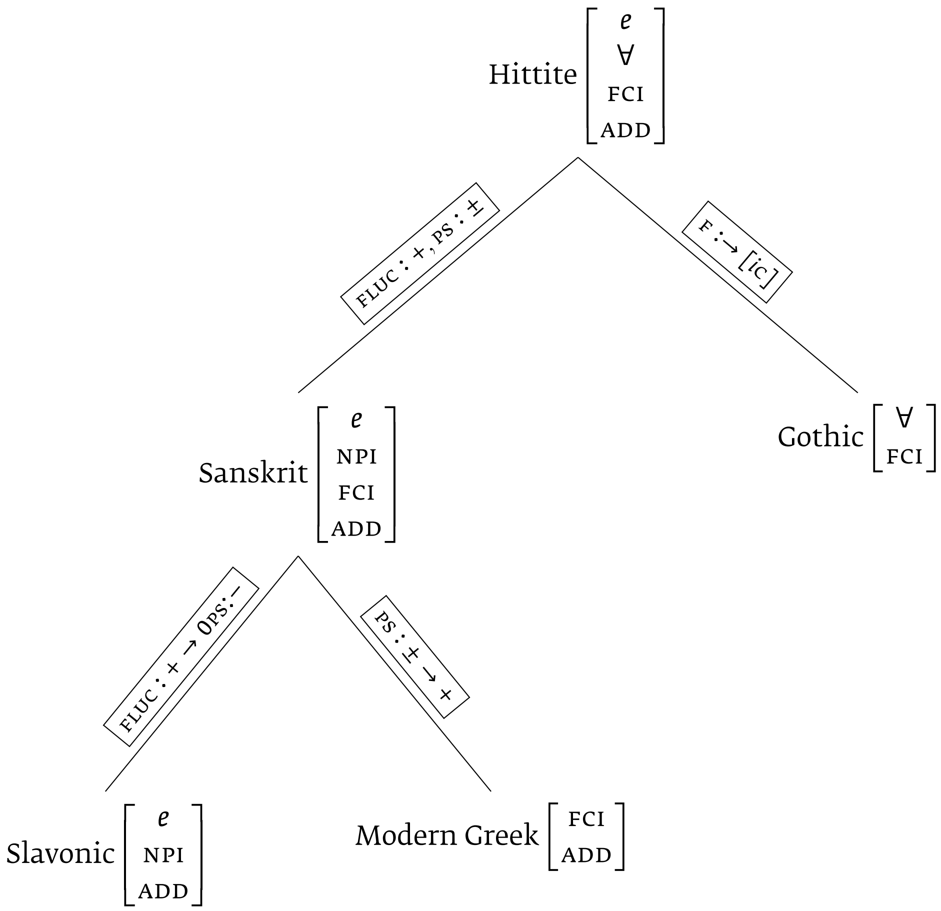
d. the iterativity parameter/constraint (ITER)

e. the wide scope constraint (WSC)

While the parametric table opens more questions than the space here allows for answering, one aspects lends itself to diachronic theorising. Namely, the relationship between the four languages, representative of different stages of IE phylogenetic history.

I entertained an interpretational evolution of $\mu$-marked meanings by invoking the economy conditions, such as PS or Fluctuation. Hittite represents an archaic system of $\mu$-marking in IE, the expression of polarity sensitivity, free choice, universal quantification, and additivity. Sanskrit, and Indo-Iranian more generally, lacks the universal quantifier meaning and, as such, can be diachronically viewed as having developed a Fluctuation-constrained expression of quantificational $\mu$ in non-DE contexts. Subsequently, I view Slavonic as having lost the Fluctuation constraint and a presuppositional condition on PS, which derives the exclusively polar sensitive taxonomy for *wh*-$\mu$ expressions. The development of the Slavonic-type is, thus, relegated to a diachronic loss of presupposition on $\mu$-meaning. Independently, Gothic reanalysed the position of $\mu$ as a clausal Focus head which, as I conjectured, blocked the polar sensitive meaning (as is possibly the case with Modern Greek). I sketch this diachronic view in (54) below.

(54)




The view advocated here also contributes in a programmatic format to the long-standing debate regarding the quantificational force of FCIs and NPIs. While one school of thought considers NPIs/FCIs as existential indefinites (Chierchia 2013, int. al.), the other takes them to be universals (Dayal 1996, int. al.). The novel proposal here is predicated on the assumption that NPIs, FCIs, and other $\mu$-type meanings are not lexical/functional heads, but rather $\mu$-phrases built on indeterminate *wh*-phrases. This, in essence, explains the indefinite core of $\mu$-expressions while deriving their universal character by virtue of $\mu$'s alternative-based semantics and, subsequently obligatory, exhaustification.

The future research in the direction advocated here, using economy conditions, would be to systematise the constrains/parameters in (53) into hierarchies in the sense of Biberauer and Roberts (2015, 2017). On the one hand, such parametric hierarchies would hopefully define a more logical relation between the parameters, such as the relation between Fluctuation and Proper Strengthening, and their overall relation, if any, to narrow syntax. On the other hand such parameter hierarchies would also reflect the diachronic directions (again, if any) of economy preference for variation and change. Such programmatic methodology seems crucial for the development of a systematic diachronic semantics which could illuminate on diachronic syntax, also.

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