QUANTIFICATIONAL CYCLES & SHIFTS

Moreno Mitrović
BLED INSTITUTE & UNIVERSITY OF CYPRUS

MANUSCRIPT · Submitted to A. Breitbarth *et al.* (eds.): *Cycles in Language Change*. Oxford: OUP.

ABSTRACT. The paper reports an inter-genetic diachronic study of quantificational particles in Indo-European (IE) and Japonic (JP), making a case for diachronic typology of syntactic-semantic unidirectional patterns of change in quantificational meanings. The quantificational expressions under investigations conform to the bimorphemic formula that comprises a *wh*-stem and a quantifier (Q) particle, e.g. $^{\star}k^{w}e$ in Proto-IE, and *mo* in Old Japanese. The grammaticalisation of scalar universal quantifiers into negative polarity items (NPIs) in the history of Japonic is presented using a single feature-system change. What is more, the same feature system is assumed to underlie the aetiology of the 'quantifier split' in Indo-European.

1 INTRODUCTION

The paper reports an inter-genetic diachronic study of quantificational particles in Indo-European (IE) and Japonic (JP), making a case for diachronic typology of syntactic-semantic unidirectional patterns of change in quantificational meanings. The quantificational expressions under investigations conform to the bimorphemic formula that comprises a *wh*-stem and a quantifier (Q) particle, e.g. $^{\star}k^{w}e$ in Proto-IE, and *mo* in Old Japanese. In Latin and Gothic, for instance, *wh*+Q formulas are universal distribute terms while in Indo-Iranian (Sanskrit and Avestan), *wh*+Q terms are consistently (polar) existentials (NPIs). The first question we address concerns the historical primacy of the two quantificational meanings (did NPIs get born out of universals or vice versa?).

Evidence from JP and ST shows a primarily universal function, hence a universal cycle of change is proposed to account for the quantifier shift in IE. The completely cyclical nature of the problem is borne out in light of the morphosyntactic origins of the quantificational $^{\star}k^{w}e$ particle. Philological evidence shows that $^{\star}k^{w}e$ has *wh*-pronominal origins with a clearly existential quantificational force. The paper provides an analysis according to which the pronominal meaning grammaticalised into an existential quantifier in IE (citing evidence from Anatolian), and then further into a universal quantifier particle (Latin, Gothic, Old Japanese, Ancient Chinese, etc.). The cycle is closed once the universal changes into a (polar) existential (Classical Japanese, Indo-Iranian, Slavonic, etc.).

One of the core conclusions that this chapters draws is that existential (∃) NPIs, and presumably Polarity Sensitive Items (PSIs) more generally, diachronically derive from distributive universal (∀) quantificational meanings. I will explain this ∀ → ∃ transition Using Chierchia's (2013b) novel

moreno@mitrovic.co http://mitrovic.co

syntactic-semantic technology for explaining Polarity Sensitivity phenomena. I aim to demonstrate that the empirical facts we observe derive as unidirectional featural changes and natural parametric switches.

In §2, I first outline the fundamental problem that investigations into particle syntax/semantics pose (namely that of particle 'multifuncitonality'). The critical notion of 'allosemy', based on Marantz's (2012) conception, is introduced. §3 then introduces a grammaticised theory of scalar implicatures, based largely on Chierchia (2013b), where the pivotal technical apparatus is presented which is used to navigate, and eventually explain, the relevant data from Indo-European and Japonic. In §4, the Indo-European problem from §2 is cross-linguistically conextualised against the background of Japonic. Diachronic facts from Japanse are presented, showing that PSIs historically originate as universal terms. Finally, in §5, the analysis of Japonic is transplanted and proposed for the diachronic treatment of quantificational expressions in Indo-European with an additional conjecture for the semantic affinity of quantificational meanings to pronominal meanings. §6 concludes.

2 THE PROBLEMS OF PARTICLE POLYSEMY AND SOLUTIONS IN PARTICLE ALLOSEMY

2.1 PROBLEMS: AT LEAST THREE

It has been recognised, at least since Gonda (1954), that the Proto-IE (PIE) particle $^{\star}k^{w}e$ is problematic with regards to what it means: on the one hand, it perfoms the connective, or rather conjunctive, function and is translatable simply as 'and'. On the other, however, $^{\star}k^{w}e$ also has some non-connective and 'epic' functions such as additivity ('also'), universal distributivity ('every/each'), as well as negative polarity ('any'). One of the aims of this paper is to address this problem with the hope of answering the historical problem: which one of these functions, if any, was first? Or, as Gonda asks:

> "The question may, to begin with, be posed whether we are right in translating Skt. *ca*, Gr. τε, Lat. *que*, etc., simply by our modern 'and' in regarding the prehistoric $^{\star}k^{w}e$ as a conjunction in the traditional sense of the term. It is a matter of general knowledge that many words which at a later period acted as conjunctions originally, or at the same time, had other functions." (Gonda, 1954: 182)

The quantificational meanings that $^{\star}k^{w}e$ and $^{\star}k^{w}e$-like particles encode do not constitute a uniform semantic class. The quantificational function of $^{\star}k^{w}e$ in IE obtains when $^{\star}k^{w}e$ is attached to a *wh*-base. In such expressions, $^{\star}k^{w}e$ may have one of the two possible meanings: (a) the universal (∀) distributive meanings ('each'), or (b) an existential (∃) negative polarity meaning.

Another problem lies in the fact that a conjunction particle like $^{\star}k^{w}e$ is etymologically related to the interogative/pronominal *wh*-stem. (Gonda, 1954; Dunkel, 2014a,b, 1982, 2000)

Therefore, the three problems of $^{\star}k^{w}e$ are in its seeming polysemy:

(1) Three problems of $^{\star}k^{w}e$:

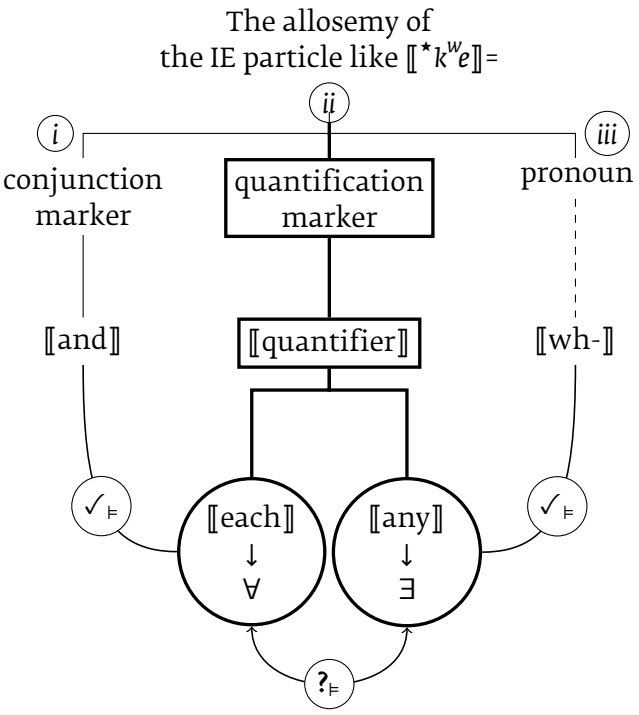


FIGURE 1: *A problematic sketch of *kwe meanings: top-most left node modelling the first problem, the middle node representing the second problem, and third (dashed) node showing the third problem.*

i. The particle $^{\star}k^{w}e$ has a CONJUNCTIVE function.
ii. The particle $^{\star}k^{w}e$ has a QUANTIFICATIONAL function.
    a. The particle $^{\star}k^{w}e$ forms UNIVERSAL quantifiers.
    b. The particle $^{\star}k^{w}e$ forms NEGATIVE EXISTENTIAL quantifiers.
iii. The particle $^{\star}k^{w}e$ has PRONOMINAL/INTERROGATIVE origins.

As the first problem has been addressed elsewhere and shown how the conjunctive meanings derive from non-conjunctive meanings (Mitrović, 2014), I will not address (1i) here. Instead, this paper focuses on the second problem given in (1iii) (which is in fact closely tied to the answer to the first problem).

In Fig. 1, the relation between these problems associated with the meaning of $^{\star}k^{w}e$ are sketched. Its three original functions, in light of the philological evidence, and the informal relations for a unified analysis are given. Logically, the algebraic meaning of conjunction can be restated in terms of universal quantification (and vide versa). On the other hand, with regard to the allegedly proniminal origins of $^{\star}k^{w}e$ (Dunkel 2014a,b, int. al.), a presuppositional meaning of a *wh*-expression is that of an existential quantifier which may be hypothesised as relating to the existential meaning of the Polarity Sensitive Items (PSIs) built from $^{\star}k^{w}e$- and $^{\star}k^{w}e$-like particles. Under these two views, the question of how the semantic obverses derive can be stated.[1]

1 In stating the semantic multi-functionality of superparticles, I terminologically and conceptually follow Marantz's (2013) notion of ALLOSEMY. See Mitrović (2014) and those cited there for details.

2.2 AIMS: AGAIN, THREE

The main purpose in this paper is to understand how the quantificational split into universal and existential functions occurred (assuming it did). To answer this question, I resort to investigating similar quantificational splits and shifts beyond IE. Independent evidence suggests that IE languages with the universal function of $^{\star}k^{w}e$, or rather a $^{\star}k^{w}e$-type particles, belong to the more retentive subfamily of IE, suggesting that polarity sensitivity, and the existential meaning of $^{\star}k^{w}e$ ($^{\star}k^{w}e$-type particles) is the result of change (both morphosyntactic and morphosemantic).

To support this view, I show that in Japonic (JP) NPIs are not historically primary but rather that they developed out of universal expressions of the same type which IE shows. While the diachronic patterns of change in JP and IE are not identical, I show how they can be treated using the same technical apparatus that is designed to explain the distribution of Polarity Sensitive Items as triggering obligatory Scalar Implicatures (SIs).

The conclusion I am led towards suggests that universals are indeed diachronically primary in these two language families, while NPIs are born from them via a particular syntactic (featural) change which has semantic-pragmatic reflexes.

Terminologically, and conceptually, I refer to $^{\star}k^{w}e$ and $^{\star}k^{w}e$-like particles as μ particles, for reasons given in §2.3.

2.3 SUPERPARTICLES

Gonda's problem, which we restated in more precise terms in (1) finds its empirical parallels in languages beyond IE. One such language is Japanese, which clearly shows the same multifunctionality of a single particle – hence termed superparticle. The Japanese particle *mo* (も) can have both conjunctional and non-conjunctional meanings (1i), hence our referring to IE quantifier particles as μ morphemes. Additionally, the combination of a *mo* superparticle with a *wh*-pronoun can yield both universal (distributive) or negative existential (NPI) expressions. This suggests that Japanese parallels IE with respect to the distributional semantics of the *mo* and $^{\star}k^{w}e$ particles, respectively.

Given in (2) are the exemplar 'superparticles' in Japanese, whose semantics have been analysed by Kratzer and Shimoyama (2002), Szabolcsi (2015), Mitrović (2014), Mitrović and Sauerland (2014, 2016), among others.

(2) The μ-series (*mo*/も)

a. CONJUNCTION

ビル (も) メアリー も
Bill **mo** Mary **mo**
B μ M μ
'(**both**) Bill **and** Mary.'

b. ADDITIVITY

メアリー も
Mary **mo**
M μ
'**also** Mary'

c. ∀ QUANTIFICATION

i. 誰 も
dare **mo**
who μ
'**each-/any-**one'

ii. どの 学生 も
dono gakusei **mo**
INDET student μ
'**every/any** student'

Old IE languages with respect to the function of $^{\star}k^{w}e$ fit the templatic pattern above seemlessly, with one exception: either the *wh-μ* (2c-i) term is universal distributive (=⟦each one⟧), or else negative polar (existential) (=⟦anyone⟧). The semantic simultanous polysemy, or allosemy, of the Japanese type in (2c-i) does not obtain in IE. Therefore the question of capturing this parameter is also cross-linguistically relevant.

In the next section, I introduce the background system and the technical apparatus that is required for the analysis.

3 THE BACKGROUND SYSTEM: A PRAGMATICS-SYNTAX CONSPIRACY AND A GRAMMATICISED VIEW OF SCALAR PHENOMENA

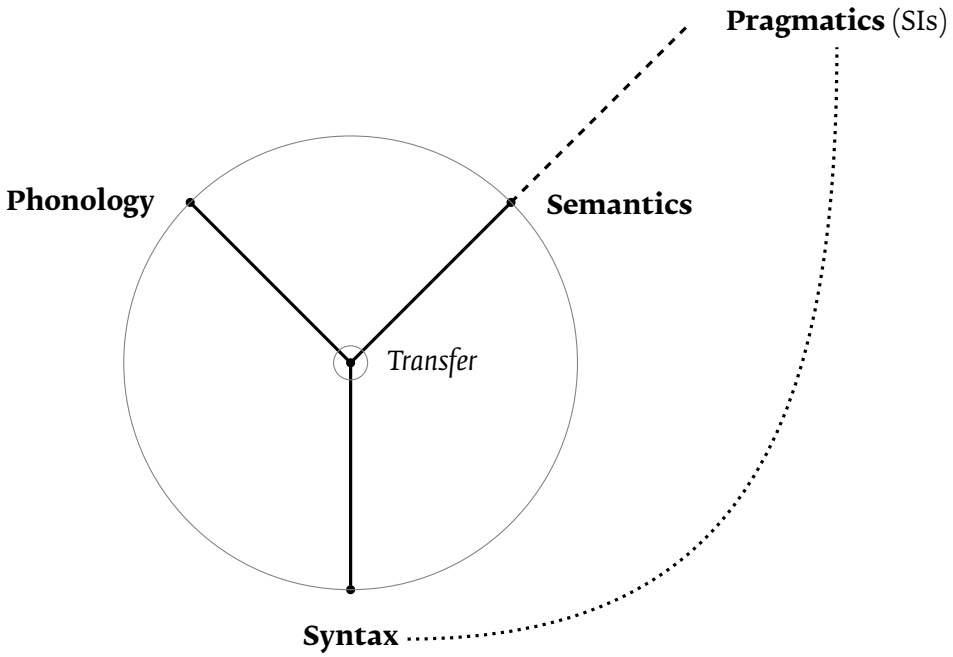


FIGURE 2: *A Y-model of linguistic modularisation, with a pragmatic extension (dashed) and a Chierchian (2013) twist (dotted).*

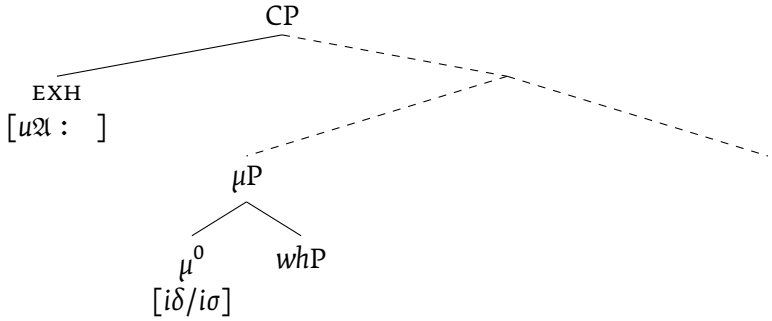
The theory I assume is that of grammaticised implicatures (Chierchia et al. 2012; Chierchia 2004; Chierchia 2013b; *int. al.*) which convincingly contends that the locus of some inherently pragmatic phenomena lies in narrow syntax. Departing from the traditional views that implicatures be viewed as an entirely pragmatic phenomenon, this view argues that implicatures are derived in the grammar.

Following a theory of grammati*ci*sed implicatures, I will suggest that polarity sensitivity may diachronically arise as a grammati*cali*sed implicature. For Japonic, I suggest that the SI resulting from the negation of a universal term behaves like a PPI and grammaticalises into an NPI, due to a syntactic parameter change. The conceptual gravity of such a change is the assumption that the relevant parameters are in fact triggers of pragmatic inferences. The Japanese particle-marked polarity system, which thus arose from an (existential) SI in Old Japanese (8th c. AD), is plotted as an instance of grammaticalisation in terms of a Minimalist feature system. Under the

assumption that such change is cross-linguistically natural, I will suggest that old Indo-European languages show the same diachronic pattern.

Let us now turn to fleshing out the technical apparatus and assumptions, which I base on, and programmatically follow, Chierchia (2013b). Alternative-sensitive inferential processes, such as those associated with implicatures (incl. polarity sensitivity, freedom of choice implicatures, SIs) or presumably focus (Fox and Katzir 2011, *et seq.*), are anchored in feature specifications on syntactic terminals. There are two such relevant features: $[\delta]$ encodes the subdomain (non-scalar) 'axis' of alternatives and $[\sigma]$ encodes the scalar dimension of alternatives alternatives. Using standard Minimalist assumptions, such as Agree and Relativised Minimality, objects bearing features $[\sigma]$ and/or $[\delta]$ obligate the system that the proposition be exhaustified against a dimension of its alternatives. The dimension is guranateed by an Agree relation between an exhaustification (EXH) operator, which performs contextual enrichment of the proposition, and the $[\pm\delta, \pm\sigma]$-bearing grammatical formatives. I suggest that μ particles are such grammatical items. A structural template for μ-expressions is roughly, then, the following.[2]

(3)



A root-level exhaustifier EXH thus probes for one or more goals carrying unvalued $[\sigma, \delta]$ features that provide its Alternative ($\mathfrak{A}$) restriction ($\sigma\mathfrak{A}$,$\delta\mathfrak{A}$). Scalar terms (*or, some*, etc.) carry (unvalued) $[\sigma, \delta]$ features which may be targeted by exhaustifiers. Some lexical items, however, such as English *any*, German *irgend-*), or indeed the μ particles, obligatorily activate alternatives, i.e. its feature specifications cannot be without a positive setting for the feature bundle, i.e. $[-\sigma, -\delta]$ is an inadmissible feature setting.

The exhaustification operator combines with a proposition, and denies as many of its alternatives as it can. In more formal terms:

(4) $\text{EXH}(p) = p \wedge \forall q \in \mathfrak{A}(p)\Big[[p \nvdash q] \rightarrow \neg q\Big]$
(p is true and no (non-entailed) alternatives (q) to p are true)

AN EXAMPLE OF THE SYSTEM IN ACTION: AMBIGUOUS DISJUNCTION Here, I briefly sketch an example of how Chierchia's (2013b) system functions with its narrow-syntactic presence in order to derive the pragmatically enriched meanings. We draw an example from disjunction. A disjunctive sentence

2 I do not commit to any specialised structural placement of μ-headed expressions here. Instead, as Mitrović and Sauerland (2014, 2016) suggest, the distribution of such expressions is best analysed using semantic type-theoretic and not syntactic category-theoretic criteria. Since μ particles are accordingly restricted to combinations with e-type elements, i.e. roughly, nominals (DPs), the μP is structured in (3) as not being directly part of the clausal spine.

in English always carries an implicature: either an ignorance implicature (5a) or a scalar implicature (SI) (5b). Consider the following example.[3]

(5) Mary saw John **or** Bill.

a. IGNORANCE IMPLICATURE

i. $\text{EXH}_{[\varnothing]}$ [Mary saw John **or**$_{[-\sigma,-\delta]}$ Bill.]

ii. $\Diamond[j] \wedge \Diamond[b] \wedge \Diamond[j \vee b] \wedge \Diamond[j \wedge b]$

iii. 'The speaker doesn't know whether Mary saw John and the speaker doesn't know whether Mary saw Bill and the speaker doesn't know whether Mary saw John and Bill.'

b. SCALAR IMPLICATURE

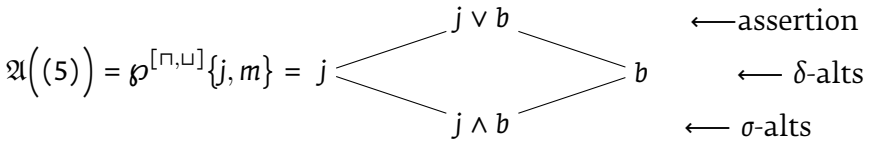
i. $\text{EXH}_{\sigma\mathfrak{A}}$ [Mary saw John **or**$_{[+\sigma,-\delta]}$ Bill.]

ii. $[j \vee b] \wedge \neg[j \wedge b]$

iii. 'Mary saw John or Bill **but not both**.

The disjunction in the sentence above makes relevant two possible dimensions of alternatives: either propositions themselves (δ-alternatives), or the conjunction of those propositions (its σ-alternative). There are two means of deriving the exclusive reading of (5)

(6) Two ways of calculating the SI of (5) and deriving the exclusive component:



i. *Global calculation of the SI via* EXH_{σ}
$\text{EXH}_{[\sigma\mathfrak{A}]}\big(j \vee b\big) = [j \vee b] \wedge \neg[j \wedge b]$

ii. *Local calculation of the SI via* EXH_{δ}
$\text{EXH}_{[\delta\mathfrak{A}]}\big(j \vee b\big) = \text{EXH}(j) \vee \text{EXH}(b) \vdash \neg[j \wedge b]$

The disjunctive example is also relevant for my purposes as I assume that the denotation of *wh*-pronouns, with which *μ* superparticles combine to yield universal/existential expressions, are themselves existential quantifiers. The latter are in turn equivalent to (discreet) disjunctions. Thus the bidimensional alternative set of (5) is on a par to an alternative set of a sentence featuring a bare *wh*-pronoun. As I suggest, recursively exhaustfying the δ-alternatives will allow us to capture the universal quantifier expressions which are built from *wh*-pronouns, as presented in Mitrović (2014).

With the technical tools in place, I discuss the diachrony of the Japonic superparticle *μ*-system in the next section.

4 THE JAPONIC QUANTIFIER SHIFT

The oldest text in Japonic dates back to the 8th century AD and allows us to see how the contemporary superparticle system (2) developed. Unlike the

3 In (5a-iii), I imprecisely state the speaker's not knowing using an existential modal for convenience and exposition.

latter, Old Japanese (OJ) superparticle *mo* did not have the role of performing conjunction, nor encoding negative polarity.[4]

What is more, OJ *μ* shows that the stipulated [*σ*] feature and the general scalar dimension of meaning is empirically motivated. §4.1 first shows the data in Old Japanese before addressing the changes that occurred in the Classical Japanese period in §4.2.

4.1 OBLIGATORY SCALARITY IN THE OLD JAPANESE PERIOD

In the earliest OJ corpus (*Man'yōshū* MYS, 8th c.), the [*wh*+*μ*] quantificational expressions were confined to inherently scalar (*σ*) complements, as first noticed by Whitman (2010).

Not only was the polar construction absent from the *μ*-system in the OJ corpus, but μ^0 subcategorised for scalar hosts only. That is, the only eligible hosts of *mo* were either numeral nominals or inherently scalar *wh*-terms: *how-many* and *when*. The combination of a numeral *n* and *μ*, yielded the least likelihood reading along the lines of '*even n*'. In the *wh*-domain, the *μ* particle created universal quantificational expressions as shown below.

Chierchia's (2013b) system gives us the descriptive power to label this *μ* as carrying [*uσ*] since non-scalar complements were disallowed:

(7) 以都母 々々々 於母加 古比 須々
itu-mo itu-mo omo-ga kwopi susu
when-*μ* **when**-*μ* mother-GEN yearning by
'I **always, always** think of my mother [i.e. at all times]'
(MYS, 20.4386; trans. by Vovin 2013: 146)

(8) 佐祢斯 [欲能 伊久陀 母] 阿羅祢婆
sa-ne-si [ywo-no **ikuda** **mo**] ara-**neba**
PRE-sleep-PAST [night-SUB **how many** *μ*] exist-NEG-COND
'As there have been **few** nights in which we slept together …'
(MYS 5.804a, ll. 46–47)

To buttress the fact that only scalar *wh*-terms were allowed, see Table 1 where counts of *μ* hosts are given.

	# of attestations
SCALAR [*wh*+*μ*]	total 24
itu mo 'when *μ*'	12
iku mo 'how much/many *μ*'	11
NON-SCALAR [*wh*+*μ*]	total 0
ado/na/nado mo 'what/why *μ*'	0
ika mo 'how *μ*'	0
ta mo 'who *μ*'	0

TABLE 1: *Distribution of ±scalar μ-hosts in OJ*

4 The details of the system presented in Mitrović (2014) in fact predict the diachronic behaviour according to which the rise of conjunction or additivity is precluded in absence of the *δ*-feature on *μ*.

The OJ *mo*, given its restriction to scalar complements, carries an uninterpretable σ-features which sufficiently captures its distribution.

(9) OJ: $\mu[\sigma]$

The fact that scalar μ-expressions in OJ under negation resist those negative inferences that obtain in NPIs, they may be analysed as Positive Polarity Items (PPIs). However, as Szabolcsi (2004: 419) notes, "*Some*-type PPIs do not occur within the immediate scope of a clausemate antiadditive operator." As seen in (8), *ywo-no ikuda mo* occurs within the scope of clausemate negation (*ne-*). More crucially, the term in non-negative contexts has a clearly universal meaning which weakens under negation but does not leave the positive scale. Thus, such constructions are best analysed as SIs. In (10), an informal sketch of positive/negative inferences is given based on the example (8).

(10) $[\![\text{[not [all nights]]}]\!] = \begin{cases} \rightsquigarrow \text{some nights} & \text{(scalar reading)} \\ \not\rightsquigarrow \text{no nights} & \text{(polar reading)} \end{cases}$

In the next subsection, we turn to the classical period of Japanese in which the negative polar inferences were licensed.

4.2 TWO CHANGES IN CLASSICAL JAPANESE

Two interlocked changes can be detected in the classical period. We take each of them in turn.

4.2.1 THE LOSS OF OBLIGATORILY SCALAR COMPLEMENTATION

The first change concerns the loss of restriction on the type of complements that the Classical Japanese μ may associate with. Unlike in the Old Japanese period, Classical Japanese *mo* can be seen to freely associate with hosts of non-scalar type. One such example is in (11), where *mo* associates with a *tare* 'who' which has as a restriction set the non-scalar subdomain of all individuals.

(11) たれ も 見おぼさん事
tare mo mi-obos-an koto
who μ see.INF-think.HON-TENT/ATTR matter
'the fact that **everybody** wanted to see' (HM II:226/2; Vovin 2003: 128)

Given the system we propose, the Classical Japanese μ is parametrised as having the $[\delta]$ feature both present and, in the case of (11), set to a positive setting. Recall that Chierchia's (2013b) systems of morphologically marked PSI requires that at least *one* of the $[\delta, \sigma]$ features be positively set.

4.2.2 THE RISE OF POLARITY SENSITIVITY

Chierchia's (2013b) system, in fact, predicts that if both $[\sigma]$ and $[\delta]$ are available features polarity sensitivity should obtain by definition of the system, *ceteris paribus*. As it happens, this is exactly what we find in non-archaic Japonic.

The rise of *μ*-marked polarity sensitivity is evident from the data in (12) where a *wh*-pronoun *nani* 'what' with a non-scalar domain extension is interpreted under negation.[5]

(12) いまは　なにの　　心　　も　なし
ima fa **nani**-no kokoro **mo** **na**-si
now TOP **what**-GEN idea *μ* NEG-FIN
'I do not have **any thoughts** [but of meeting you] now'
(IM XCVI: 168.9; Vovin 2003: 424)

Therefore, the Classical (early middle) Japanese *μ*-system can be analysed as bearing both [*σ*] and *δ* features, unlike OJ.

(13) OJ: $\mu[\sigma] \xrightarrow{t}$ CJ: $\mu\begin{bmatrix}\sigma\\ \delta\end{bmatrix}$

This is motivated by the fact that both scalar and non-scalar complements featured in polarity sensitive and scalar expressions. The novel possibility of non-scalar hosts associating with *μ* requires us to posit the relevant uninterpretable [*uδ*] feature on the *μ* particle, by virtue of which the negative polarity system arises automatically, as per the predictions of Chierchia's (2013b) system.

Therefore, the relevant change is that in the type of inference that *wh*-*μ* expressions carried. In OJ, such expressions are analysed as (positive) SIs, while the Classical Japanese *wh*-*μ* expressions were, or at least could be, NPIs under negation.[6] In (14a) and (14) I present this view of change in inferential procedure due to featural change, which I analyse as the signature property of the grammaticalisation of *μ* in Japonic.

(14) a. OJ: ¬ > ∀ ⊢ ¬∀ (SI)

i. $[\![$ EXH $[u\mathfrak{A} : \sigma]$ ¬ μ_1P (μ_1^0 $[u\sigma]$, *wh*P $[i\sigma]$) $]\!] \rightsquigarrow \mathrm{SI}^+$

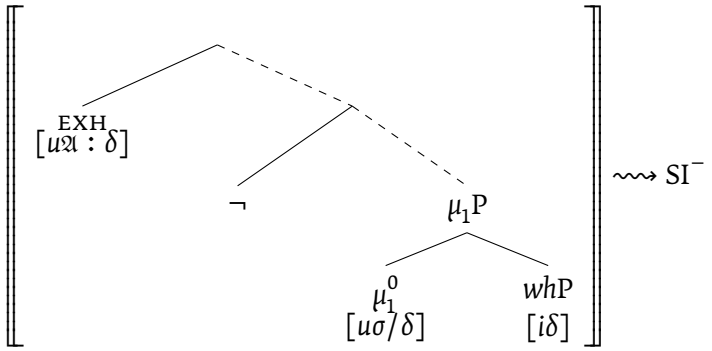
ii. $\mathrm{EXH}_{[\sigma\mathfrak{A}]}\left[\neg\left[\ldots\left[_{\mu\mathrm{P}} \quad \exists_{[+\sigma]} \quad \mu\right]\right]\right]$

b. CJ: ∀ > ¬ ⊢ ¬∃ (NPI)

5 Another aspect of change concerns the type-complexity of the *μ*-associate, considering the parallel between (2c-i) and (2c-ii). As opposed to bare *wh*-terms in OJ, Classical Japanese allowed [*wh* NP] complexes (taken to denote sets of type ⟨*e*, *t*⟩, as per Shimoyama 2006) to associate with *μ*. The same diachronic pattern can be found in the history of Chinese. (Mitrović and Hu, 2016)

6 Note that in Chierchia's (2013b) system, which is assumed here, both (positive) SIs and NPIs are derived using the same apparatus.

i.



ii. $\text{EXH}_{[\delta Q]}\Big[\neg\big[\ldots\big[_{\mu P}\quad \exists_{[+\delta]}\quad \mu\big]\big]\Big]$

I will address in §5.2 the technical details of deriving the meanings above. In the next section, I proceed to apply this technical analysis to the IE superparticle system by showing how this application derives the desired natural classes of NPIs and universal (PPI) terms we laid out in §2.

5 INDO-EUROPEAN QUANTIFIER SHIFT

The quantificational shift of meanings in IE is not identical to that I showed for Japonic, but may be modelled using the same principles. In §5.1, I first show the nature of the quantifier split before proceeding in §5.2 to providing a synchronic analysis of the two types of meanings underlying the quantifier split. §**??**, I show how the split can be analysed diachronically as a shift from one (universal quantificational) meaning to the other (existential quantificational).

5.1 QUANTIFIER SPLIT & TWO SUPERPARTICLE MEANINGS

Earliest IE languages fall into two classes with respect to the interpretation of [*wh*-*μ*] expression. These superparticle meanings are consistent throughout early Indo-European (with Homeric *-te* being an exception) and are given in the table. The relevant classes, or properties, are boxed.

LANGUAGE (FAMILY)	*μ* MARKER	CONJ.	ADDITIVE	DISTR.	NPI	FCI
OC Slavonic (Slav.)	*i*	+	+	−	[+]	−
Ṛgvedic (Indo-Iranian)	*-ca*	+	+	−	[+]	+
Gothic (Germanic)	*-uh*	+	+	[+]	−	+
Latin (Italic)	*-que*	+	+	[+]	−	+
Hittite (Anatolian)	*-(y)a*	+	+	[+]	−	+
Tocharian B (Toch.)	*-ra*	+	+	[+]	−	+
Old Irish (Celtic)	*-ch*	+	(+)	[+]	−	+
Homeric (Greek)	-τε	+	(+)	−	−	(+)

TABLE 2: *Semantic distribution of the meanings of μ markers across early Indo-European*

Assuming the PIE *μ* is reconstructable, in functional and not necessarily in the single morphophonemic form, table 2 suggests that a quantifica-

tional split took place in early IE with regards to the interpretation of the expression containing an indefinite *wh*-word and a conjunctive particle μ like *$k^w e$. Note that the categorisation of the μ category is based on the multifunctionality of a particle: i.e., if a particle *x* shows contextual allosemy (Marantz, 2013; Mitrović, 2014) and differential interpretation, then *x* is a superparticle.

In one group in Table 2, ⟦*wh*-term+μ⟧ shows polar sensitivity and is generally translatable into the NPI 'any'. This group is generally the satem one. As per traditional taxonomy, it is indeed Indo-Iranian (Ṛgvedic) and Balto-Slavic (Old Church Slavonic), to the exclusion of Tocharian, that shows NPI behaviour. In another group, on the other hand, ⟦*wh*-term+μ⟧ is interepreted as a universal distributive, paraphrasable as 'every' or rather 'each'.

What is another striking property of the comparative morphosemantics of IE superparticles is that μ was rather universally operative (to the exclusion of Slavonic) in building Free Choice Items (FCIs). Perhaps less surprisingly, it is not coincidental that FCIs show both universal and existential behaviour (Chierchia, 2013b). The analysis of FCIs in (P)IE falls outside of the scope of this paper.

Let us now take each of the two groups in turn. For THE POLAR GROUP, take two examples from Ṛgvedic in (15) and Old Church Slavonic in (16). While the former NPI contains an enclitic (Wackernagel) μ clitic, Slavonic had a μ superparticle *i* that was not a Wackernagel element. The presence of the negative morpheme pricliticising onto *i* is a negative concord reflex (Mitrović, 2014; Gajić, 2016).

(15) VEDIC & CLASSICAL SANSKRIT (INDO-IRANIAN)
न यस्य कश्च तितिरति माया
na yasya [kaś-**ca**] titítarti 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.' (*Bhāgavatapurāṇa*, 8.5.30)

(16) OLD CHURCH SLAVONIC (SLAVONIC)
ⱀⰻⱍⰵⱄⱁⰶⰵ ⱁⱅⱏⰲⱑⱎⱅⰰⰲⰰⰰⱎⰵ
n-**i**-česo-že otŭvěštavaaše
NEG-μ-WH-REL=nothing answer.IMPF.3.SG
'He answered nothing.' (*Codex Marianus*, Mt. 27:12)

On the other hand, the UNIVERSAL GROUP of IE languages, the same expression containing a *wh*-indefinite and a μ particle is interpreted a universal quantifier. Consider the following examples from Latin (17) and Gothic (18).

(17) LATIN (ITALIC)
auent audire quid [quis- **que**] senserit
want hear what what- μ think
'they wish to hear what **each** man's (everyone's) opinion was'
(Cic. *Phil.* 14,19)

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

'And **every** one that heareth these sayings of mine …'
(*Codex Argenteus*, Mt. 7:26)

Such universals expressions are insensitive to the polarity of the (local) environment they appear in. As (19) shows, the universal term is easily embedded in a antimorphic context in which it gives rise to a SI.

(19) GOTHIC (GERMANIC)

𐌽𐌹	𐍆𐌰𐍃	𐌽𐌷	𐍃𐌰𐌴𐌹	𐌹𐍆𐍉𐍆	𐌷𐌹𐍃 𐍀𐍂𐌰𐌿𐌾𐌰 𐍀𐍂𐌰𐌿𐌾𐌰
ni	[hvaz-	**uh**]	saei	qiþiþ	mis frauja frauja
NEG	who.M.SG *μ*		REL.M.SG	say.3.SG	I lord.VOC lord.VOC

𐌹𐌽𐌽𐌲𐌰𐌻𐌴𐌹𐍆𐍉𐍆	𐌹𐌽	𐍆𐌹𐌿𐌳𐌰𐌽𐌲𐌰𐍂𐌳𐌾𐌰 𐌷𐌹𐌼𐌹𐌽𐌴
inngaleiþiþ	in	þiudangardja himine
enter.3.SG	in	kingdom.SG.ACC heaven.PL.GEN

"**Not everyone** who says to me, 'Lord, Lord,' will enter the kingdom of heaven" (*Codex Argenteus*, Mt. 7:21)

The question that is central to the concerns of this paper is: Which of the two meanings, the POLAR or the UNIVERSAL, is the primitive and reconstructable one? Just like in Japonic, I analyse IE *μ* as primitively expressing universal quantifications. While the diachronic Japonic data allowed for a clear view that polarity sensitivity and NPI expressibility arose in the classical period, the IE data does not show such a trend and requires reconstruction.

Using Chierchia's (2013) model of grammaticised implicatures, we relegate the semantic change from the universal to polar expression to featural (⊨semantic) change. One crucial aspect of this change and the rise of grammaticised polarity-sensitivity is the availability of subdomain *δ*-exhaustification, the details of which we explicate in the next section.

5.2 THE MEANING OF *μ* & THE DIFFERENTIAL INTERPRETATION

Lexical items, such as *any*, *-ever*, *all*, *also*, and *and* are morphologically marked in many languages with a uniform *μ* morpheme. I have demonstrated that such meanings obtain in IE and JP as well.[7] The semantics we ascribe *μ* states, informally, that *μ* superparticles have a dual semantic (or pragmatic) function. The first is to bring into play active alternatives which cannot be pruned by context alone. That is, *μ* superparticles, like IE $^{\star}k^{w}e$ or (Old) Japanes e*mo*, are presumed to activate alternatives of their morphosyntactic associates. The second function is rather independent from the first: the grammatical system then acts on the triggered alternatives by applying the operation of exhaustification by virtue of a grammatically present (covert) formative, conceptually analogous to Rooth's (1985, 1992) '~'-operator that derives focus meanings.

The *μ* marker (superparticle), then, fundamentally makes sure that the alternatives (𝔄) of its host are obligatorily active, an idea proposed for morphologically marked PSIs by Chierchia (2013a).[8] An exhaustifier, covertly present in the morphosyntactic structure as the EXH operator, then 'filters'

7 See Mitrović (2014) for a detailed empirical motivation of this view as well as details concerning the analysis briefly sketched here.

8 Empirically, we broaden the range of this semantic class of *μ*-morphemes so as to include universals; elsewhere, I also include and cover additive and conjunctive meanings also.

such alternatives either by denying them (in case EXH applies once) or asserting all of them (in case EXH applies iteratively; discussed below). What we adopt, then, is a syntactically present focus-sensitive exhaustification operator (itself essentially a silent variant of *only*).

The lexical entry for μ in (20) below (rather imprecisely) states the aforementioned dual function that μ particles have: alternative activation (second line) and exhaustification (third line) against the background of activated alternatives ($\mathfrak{A}$).

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

$$\begin{aligned} \left[\!\!\left[\begin{array}{c} \mu P \\ \diagup \quad \diagdown \\ \mu^0 \qquad XP \end{array} \right]\!\!\right] &= [\![\mu]\!]^{M,g,w}\Big([\![XP]\!]\Big) \\ &= \{[\![XP]\!]\}^{\mathfrak{A}} \\ &\rightarrow \textsc{exh}\Big([\![XP]\!]\Big)\Big(\{[\![XP]\!]\}^{\mathfrak{A}}\Big) \end{aligned}$$

The core building block of the semantics of μ will be alternative activation and exhaustification procedure as proposed in Chierchia (2013b). Exhaustification is taken to be a syntactically grounded pragmatic instruction to "run the Gricean reasoning". We also adopt a more detailed instruction "run the Gricean reasoning *iteratively*", where we accept an iterative mode of application of the relevant maxims, as noted by Chierchia (2013b: 113, fn. 22). The main reason for adopting this 'extended' Gricean reasoning and defining exhaustification iteratively (i.e., allowing EXH to apply iteratively) is that this iterativity characterisation grants us a transition between exhaustivity and antiexhaustivity. As Fox (2007) has shown, a double application of EXH returns $\neg$EXH and therefore allows us to see a natural switch between *only* and *also* (since *not only = also*). See Fox's (2007) for a detailed account and complete proof of this theorem.

The range of meanings μ delivers along these lines are the following:

(21) $$\textsc{exh}_{[\delta\mathfrak{A}]}(p) = \begin{cases} \text{polarity reading} & \text{if under } \neg \\ \text{FC reading} & \text{if under } \diamond \\ \text{additive reading} & \text{if EXH is iterative } (\textsc{exh}^2) \\ \bot & \text{otherwise} \end{cases}$$

The differential meanings outlined above are amenable to an allosemic analysis, where the locality context for allosemy of μ are taken to be structures containing the relevant anti/licensing properties. We now take the two relevant types of μ-meanings in turn: the NPI/PSI existential meaning and the universal quantificational meaning.

POLARITY In an exhaustification-based approach, polarity phenomena are derived in the following way. Our exemplar is based on (15), which we repeat in (22) below.

(22) न यस्य कश्च तितिरति मायाः
na yasya [kaś-**ca**] tititarti māyā?
NEG whom.GEN [who.M.SG-μ] able to overcome illusions.PL

'[There is] No one [=not **anyone**] can overcome that (=the Supreme Personality of Godhead's) illusory energy.' (*Bhāgavatapurāṇa*, 8.5.30; =15)

I innocently assume that the LF of (22) is analogous to 'There is not anyone who can overcome' (where I ignore the remainder of the sentence and the complexity of the object).

(23) $\Big[\textsc{exh}_{[\delta\mathfrak{A}]}\big[$ There is **not** [*who*$_{[\delta]}$-μ] who can overcome $\big]\Big]$ ..... =(22)

a. ASSERTION: $(= p)$
$\neg\exists x \in \mathfrak{D}\big[\textsc{human}(x) \wedge \textsc{overcome}(x)\big]$

b. $\mathfrak{A}(p) = \Big\{\neg\exists x \in \mathfrak{D}'\big[\textsc{human}(x) \wedge \textsc{overcome}(x)\big] \mid \mathfrak{D}' \subset \mathfrak{D}\Big\}$

c. $\textsc{exh}_{[\delta\mathfrak{A}]}(p) = p$
($\because$ all alternatives are entailed under negation)

In order to derive negative polar inferences, a single operation of exhaustification is sufficient to capture the distribution of NPIs which, in our empirical set, are formed by μ-marking the *wh*-expressions. The superparticle obligates the activation of the δ-alternatives of *who* (26b). Once active, the alternatives require narrow-syntactic pruning which legislates the EXH-operator. The presence of EXH exhasutifies the NPI- (or μ-) containing proposition: it asserts the existential proposition and negates all non-entailed alternatives to that proposition. Given the negative polarity of the proposition, the polarity of entailment is reversed and all alternatives to the prejacent existential proposition are entailed, hence the original meaning of the prejacent is return, as desired, since no alternatives may be be negated.

The successful operation of the of the EXH-operator is guaranteed as long as it targets and eliminates alternatives that are stronger (and are entailed by) the assertion. What if they are not? In these cases, other principles are at play and the semantics of μ (allosemically) derives universal inferences.

DISTRIBUTIVE UNIVERSALS In both negative and non-negative context, the μ in the UNIVERSAL GROUP of IE languages derives universal quantifications. Hence, the presence of negation is not cached in at the point of SI calculation.[9] The first 'parameter' relevant for the switch between negative polar (existential) and unviersal μ-marked *wh*-constructions lies in the locality: polar constructions are sensitive to structural domains large enough to include negation, while the universal constructions, as I show below, are insensitive to the presence of negation in the relevant domain. I propose to capture this in/sensitivity to the presence of negation using 'timing'. Before fleshing out the analysis, consider an exemplar in (17), repeated in (24) below.

(24) LATIN (ITALIC)

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

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

9 I assume, generally in line with Chierchia (2013b), that polarity sensitivity phenomena are special(ised) instances of scalar inferences.

I assume the relevant LF to be 'They wish to hear everyone' (ignoring the possessive complement for reasons of simplicity of exposition). The denotation of the *wh*-pronoun 'who', i.e. μ's host, is taken to be an open existential quantifier, roughly denoting 'someone' (for whom a property P holds):

(25) $[\![\text{who}]\!] = [\![\text{someone}]\!] = (\lambda P)\exists x\big[\textsc{human}(x)\ (\wedge\ P(x))\big] = a \vee b \vee \ldots\big(\in P\big)$

In absence of negation, which would make impose that all alternatives be entailed, exhaustification leads to a contradiction. Assuming δ-exhaustification operates over discreet disjuncts provided by the (presuppositional component of the) denotation of the *wh*-pronoun *quis* 'who', the meaning we obtain would be analogous to 'only *a*' or 'only *b*', or ...or 'only *x*' is such that they wish to hear them.

(26) $\Big[\textsc{exh}_{[\delta\mathfrak{A}]}\big[$ They wish to hear $[\mathit{who}_{[\delta]}\text{-}\mu]\ \big]\Big]$ ..... =(22)

a. ASSERTION: $(= p)$
$\forall x \in \mathfrak{D}\big[\textsc{human}(x) \rightarrow \textsc{wish-hear}(\textsc{they}, x)\big]$

b. $\mathfrak{A}(p) = \Big\{\exists x \in \mathfrak{D}'\big[\textsc{human}(x) \wedge \textsc{wish-hear}(\textsc{they}, x)\big] \mid \mathfrak{D}' \subset \mathfrak{D}\Big\}$

c. $\textsc{exh}_{[\delta\mathfrak{A}]}(p) = p \wedge \neg p = \bot$
($\because$ exhaustifying the alternatives contradicts the prejacent)

Given that this would lead to a contradiction, exhaustification must apply once more, which yield anti-exhaustivity, or additivity.[10] Now, each alternative is asserted in conjunction with the prejacent: '*a* and *b* and ...and *x* is such that they want to hear them', a reading fully compatible with the universal meanings these μ particles enforce in the UNIVERSAL GROUP.

(27) a. FIRST-LEVEL EXHAUSTIFICATION OF $\mathfrak{A}$ TO THE WH-PRONOUN:
$\textsc{exh}_{[\delta\mathfrak{A}]}(a \vee b) = \textsc{exh}(a) \wedge \textsc{exh}(b)(\vdash \bot)$

b. SECOND-LEVEL EXHAUSTIFICATION OF $\mathfrak{A}$ TO THE WH-PRONOUN:
$\textsc{exh}^{R}_{[\delta\mathfrak{A}]}(a \vee b) = \neg\textsc{exh}(a) \wedge \neg\textsc{exh}(a) \vdash a \wedge b \quad (\vdash \neg\bot)$

The reapplication of the EXH is not mandated if the structure in which μ features contains a modal operator – this gives rise to the Freedom of Choice inference, which, as I presented in Table 2. FCIs thus appear as an economical, or most economical, means of delivering conjunctive inferences which may well be the factor for the wide-spread, if not universal, distribution of μ-marked FCIs in IE.

5.3 A VIEW OF CHANGE: A WIDER PERSPECTIVE

Before concluding in the next section, we discuss another aspect of the history of μ-markers in IE. Philological literature contends that $^{\star}k^{w}e$ and $^{\star}k^{w}e$-like μ superparticles originate as pronominal stems. How can we countenance the view that quantificational meanings diachronically derive from pronouns? In this subsection, I outline a conjecture for a view.

The allegedly primary semantic nature of $(^{*})^{*}k^{w}e$ is puzzling in light of philological evidence of indefinite/*wh*-cognates. However, it may be modelled using modern semantics: $[\![\text{wh}]\!] \mapsto [\![\exists]\!]$. Indefinite core of $[\![\text{wh}]\!]$ wrt.

10 For an implementation and independent arguments for recursive exhaustification yielding anti-exhaustive (additive) inferences, see Fox (2007), Mitrović (2014), Bowler (2014), Mitrović and Sauerland (2016), Szabolcsi (2017b,a).

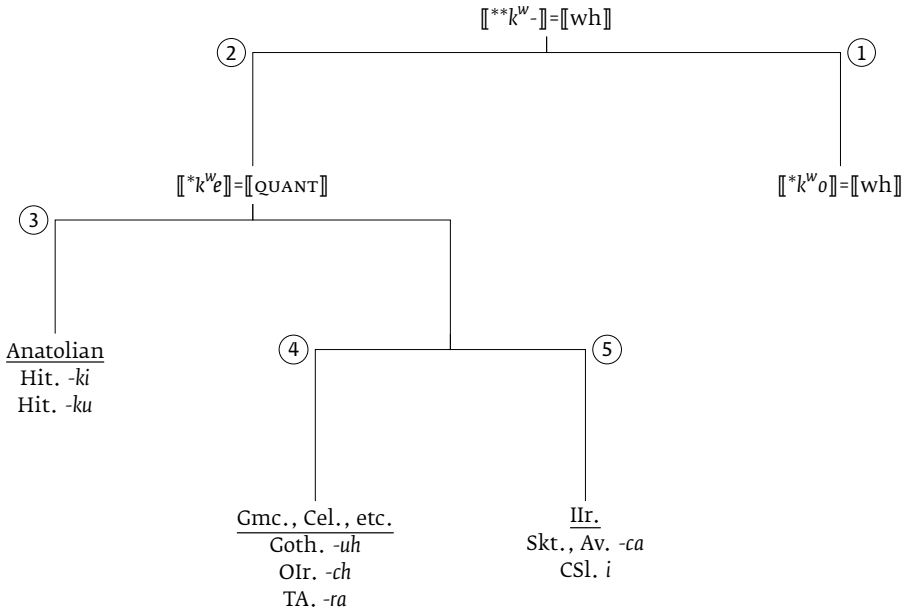


FIGURE 3: *A 5-step semantic-splitting pathway for wh-based semantic origins of superparticles in IE.*

its presuppositional contents, is grammaticised into a ∃-quantifier. This is represented by (1) in the figure.

In this regard, the existential force of $^{\star}k^{w}e$ may be reconstructed and its reflexes in both quantificational pronominal and expressions. In the former, the existential quantification is part of the presuppositional component of meaning, while in the latter the existential is asserted. The evidence for the reflex of this stage can be found in Anatolian (cf. Hittite particles *-ki* and *-ku*), as per (2) in the figure. As such, the particle is an ∃-quantifier which is subject to reanalysis along the lines of strengthening, conjecturally via a SI. In combination with *wh*-terms, an existential quantifier particle would trivially and vacuously assert the meaning that is contributed by the presupposition on the *wh*-term. As such, I conjecture there may have been a procedure of the reversal of quantifier scales, i.e. a scalar shift. Presumably analogous, at least programmatically, to the proposed analysis for Japonic, this is seen at stage which ultimately splits into (4) and (5) in the figure.

6 CONCLUSIONS & OUTLOOK

Assuming Chierchia's (2013b) research programme, which rests on the simple observation that the distribution of SIs is a Polarity sensitive phenomenon, this chapter has shows diachronic reflexes of the Polar and Scalar system of pragmatic strengthening. Implicatures strengthen meaning by reducing the logical space of possible meanings, as do Polarity Sensitive Items (PSIs).

In order to understand the semantic split of polar/universal meanings of early IE *wh+μ* terms, we have adopted a diachronic-comparative approach and developed an analysis of Japonic.

In Old Japanese, the [*wh+μ*] quantificational expressions were confined to inherently scalar (*σ*) complements, i.e. either numeral nominals or inherently scalar *wh*-terms (e.g. how-many/when), as Whitman (2010) first noticed. The combination of a numeral ($n \in \mathbb{N}$) and *μ*, $[_{\mu P}\ n\ \mu^{0}]$, yielded '*even*

n'. In this chapter, I focused on the latter and ignored the former numeral μ-hosts. The only two kinds of *wh*-terms which we find in OJ that may serve as μ-hosts are temporal- and quantity-*wh*-terms (7), i.e. those *wh*-abstracts with only a σ-domain of alternatives.

One of the ideas central to the proposal made in the paper is that the original μ^0 associated with scalar hosts, i.e. those elements endowed with $[\sigma]$ feature, and that the exhaustification of the scalar space of alternatives, as per Chierchia's (2013b) system, delivered positive inferences. The prediction that scalar exhaustification of existential *wh*-terms makes is that, under negation, SIs should be borne our – as it is, indeed, the case in OJ.

We have hypothesises a narrow syntactic featural change from $[+\sigma, (-\delta)]$ to $[+\delta, (-\sigma)]$ for the development of polar expressions of the same morphosyntactic structure. This has been confirmed by the Early Middle Japanese (EMJ) where we encountered the rise of the polarity system. An additional and parallel reflex of this change also the shift from the meaning of 'even' (as a scalar additive with a presumably intrinsic $[+\sigma]$ feature) to 'also' (a non-scalar additive with $[+\delta]$ specification).[11]

I have thus not shown how synchronically explanatory and predictively powerful Chierchia's (2013b) exhaustification-based approach to polarity sensitivity and scalarity systems is. I have demonstrated how using it the semantic changes in Japonic and Indo-European may be modelled. It is also clear that there is (a rather unexplored amount) of room in historical linguistics for cross-linguistic diachronic analyses using such theoretical technology.

With novel and theoretically motivated precision of viewing *wh*-μ terms in IE (=$^\star k^w o$-$^\star k^w e$), I have presented a novel view of a 'quantificational split' in IE. Using a cross-diachronic filter from Japonic, I have modelled a view of diachronic evolution of such quantificational terms, and shown that any serious treatment of quantificational cycles, shifts, and splits cannot proceed seriously without resorting to formal semantic models.

REFERENCES

Bowler, M. (2014). Conjunction and disjunction in a language without 'and'. In Snider, T., D'Antonio, S., and Weigand, M., editors, *Proceedings of SALT 24*, pages 137–155.

Chierchia, G. (2004). Scalar implicatures, polarity phenomena, and the syntax/pragmatics interface. In Belletti, A., editor, *Structures and Beyond: The Cartography of Syntactic Structures*, volume 3, pages 39–103. Oxford: Oxford University Press.

Chierchia, G. (2013a). Free choice nominals and free choice disjunction: The identity thesis. In Fălăuş, A., editor, *Alternatives in Semantics*, pages 50–87. London: Palgrave Macmilan.

Chierchia, G. (2013b). *Logic in Grammar: Polarity, Free Choice and Intervention*. Oxford studies in semantics and pragmatics 2. Oxford: Oxford University Press.

11 This independent piece of evidence is also relevant for the nature of development of conjunction marking, the investigation of which fell outside the scope of this paper. See Mitrović (2014) and those he cites for details.

Chierchia, G., Fox, D., and Spector, B. (2012). Scalar implicatures as a grammatical phenomenon. In Maienborn, C., von Heusinger, K., and Portner, P., editors, *Handbook of linguistics and communication science*, volume 3, pages 2297–2332. New York: Mouton de Gruyter.

Dunkel, G. E. (1982). IE conjunctions: pleonasm, ablaut, suppletion. *Zeitschrift für vergleichende Sprachforschung*, 96(2):178–199.

Dunkel, G. E. (2000). The common origin of conjunctive **-kwe* and of adverbial **-s*. In Hintze, A. and Tichy, E., editors, *Anusantatyai. Festschrift für Johanna Narten zum 70. Geburtstag*, number 19 in Münchener Studien zur Sprachwissenschaft, pages 11–30. Dettelbach: J.H. Röll.

Dunkel, G. E. (2014a). *Lexikon der Indogermanischen Partikeln und Pronominalstämme*, volume 1. Heidelberg: C. Winter.

Dunkel, G. E. (2014b). *Lexikon der Indogermanischen Partikeln und Pronominalstämme*, volume 2. Heidelberg: C. Winter.

Fox, D. (2007). Free choice and scalar implicatures. In Sauerland, U. and Stateva, P., editors, *Presupposition and Implicature in Compositional Semantics*, pages 71–120. London: Palgrave Macmilan.

Fox, D. and Katzir, R. (2011). On the characterization of alternatives. *Natural Language Semantics*, 19:87–107.

Gajić, J. (2016). Coordination and focus particles (re?)united. *Proceedings of Sinn und Bedeutung 21*. Preprint available at `https://sites.google.com/site/sinnundbedeutung21/proceedings-preprints`.

Gonda, J. (1954). The history and original function of the Indo-European particle **kwe*, especially in Greek and Latin. *Mnemosyne*, 4(7):177–214.

Kratzer, A. and Shimoyama, J. (2002). Indeterminate Phrases: the View from Japanese. In Otsu, Y., editor, *The Proceedings of the Third Tokyo Conference on Psycholinguistics*, pages 1–25. Tokyo: Hituzi Syobo.

Marantz, A. (2012). Locality domains for contextual allomorphy across the interfaces. In Matushansky, O. and Marantz, A., editors, *Distributed Morphology Today*, pages 95–115. Cambridge, MA: MIT Press.

Marantz, A. (2013). Locality domains for contextual allosemy. In Matushansky and Marantz, A., editors, *Distributed Morphology Today: Morphemes for Morris Halle*, pages 95–115. Cambridge, MA: MIT Press. Paper presented at the Columbia Lingusitic Society.

Mitrović, M. (2014). *Morphosyntactic atoms of propositional logical: a philo-logical programme*. PhD thesis, University of Cambridge.

Mitrović, M. and Hu, X. (2016). The grammar of distributivity in Ancient Chienese. Paper presented at the *9th International Symposium on Ancient Chinese Grammar*. Berlin, 30/7.

Mitrović, M. and Sauerland, U. (2014). Decomposing coordination. In Iyer, J. and Kusmer, L., editors, *Proceedings of NELS 44*, volume 2, pages 39–52.

Mitrović, M. and Sauerland, U. (2016). Two conjunctions are better than one. *Acta Linguistica Hungarica*, 63(4):471–494.

Rooth, M. (1985). *Association with Focus*. PhD thesis, University of Massachusetts at Amherst.

Rooth, M. (1992). A theory of focus interpretation. *Natural Language Semantics*, 1:75–116.

Shimoyama, J. (2006). Indeterminate phrase quantification in Japanese. *Natural Language Semantics*, 14:139–173.

Szabolcsi, A. (2004). Positive polarity–negative polarity. *Natural Language & Linguistic Theory*, 22(2):409–452.

Szabolcsi, A. (2015). What do quantifier particles do? *Linguistics and Philosophy*, 38:159–204.

Szabolcsi, A. (2017a). Additive presuppositions are derived through activating focus alternatives. To appear in the *Proceedings of the Amsterdam Colloquium 2017*. Preprint available at `lingbuzz/`003759.

Szabolcsi, A. (2017b). Disjunctive and conjunctive particles meet their negative concord relatives. Paper presented at *ICHL23*. Workshop on *Logical Vocabulary & Logical Change*. San Antonio, TX.

Vovin, A. (2003). *A Reference Grammar of Classical Japanese Prose*. London: Routledge.

Vovin, A. (2013). *Man'yōshū, Book 20, a new English translation containing the original text, kana transliteration, romanization, glossing and commentary.* Leiden: E.J. Brill.

Whitman, J. (2010). 否定構造と歴史的変化 — 主要部と否定極性表現を中心に [hitei kōzō to rekishi teki henka — shuyōbu to hitei kyokusei hyōgen o chūsin ni]. In Katō, Y., editor, 否定と言語理論 *[Hitei to gengo riron]*, pages 141–169. Tokyo: Kaitakusha. Ms.