THE GREAT QUANTIFIER SHIFT

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OUTLINE

- We report a large-scale 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 the domain of quantifier particles.
- In a nutshell: NPIs are born out of ∀s.
  - We demostrate this in two genetically unrelated families:
    i. Indo-European
    ii. Japonic
  - We explain this using a theoretical model which makes the unidirectional switch natural. (Chierchia, 2013)

1 INTRODUCTION: THE INDO-EUROPEAN **kwe* AND ITS KIN(D)

1.1 Problems: at least three

- Ever since Gonda (1954) we know that the Proto-Indo-European **kwe* is semantically problematic:
  (1) it has a connective function ..... CONJUNCTION
  (2) and a non-connective 'epic' function ..... QUANTIFICATION
- Or, as Gonda (1954) 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 **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)

- To make matters *prima facie* worse, this paper shows that the second non-connective QUANTIFICATIONAL function is non-singular—when attached to a *wh*-base, **kwe* may generate one of the two possible quantificational expressions:
  (2A) universal (∀) distributive terms..... DISTRIBUTIVE FUNCTION

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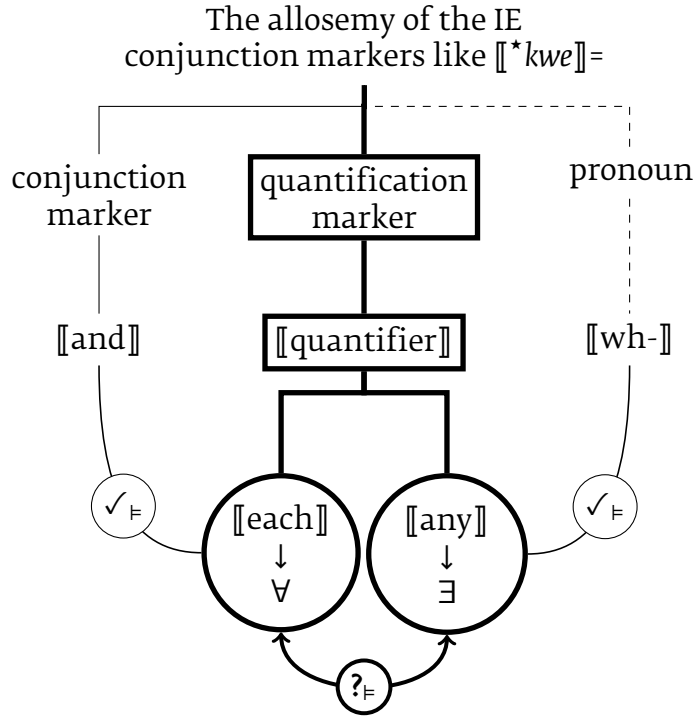
2B negative polarity indefinite (∃) terms ..... POLAR FUNCTION

- The last preliminary complication lies in the fact that a conjunction particle like ⋆*kwe* is etymologically related to the interogative/pronominal *wh*-stem. (Gonda, 1954; Dunkel, 2014a,b, 1982, 2000)

  3 logical connective ⋆*kwe* and *wh*-stem ⋆*kwo/-i* have a common origin, so how can ⟦and⟧≅⟦who⟧? ..... PRONOMINAL FUNCTION?

- We focus on the second problem – the connection to (and possible solutions for) the first and third problem will fall out of the analysis.



1.2 Aims: again, three

- to present a cross-genetic pool of evidence for the rise of polarity sensitivity,

PATTERN: In both IE and JP, the distributive quantificational function is primary.

- to investigate the diachronic directions of indefinite semantics

CONCLUSION: universals are diachronically primary, NPIs are born from them via syntactic (featural) change.

- to conjecture an indefinite pathway of semantic genesis of ⋆*kwe*, assuming it originates as a pronominal/interrogative *wh*-term

CONJECTURE: An inherently predicate-abstracting function of ⟦kwo/-i⟧ is substituted for an existentially-closing function, yielding an scalar term: λ → ∃

- I will refer to ⋆*kwe* and ⋆*kwe*-like particles in IE as *μ* particles, for following reasons.

1.3 Superparticles

- Japanese conjunction particle も *mo* can have both conjunctional and non-conjunctional meanings, hence our referring to IE quantifier particles as *μ* morphemes.
- IDEA: Japanese and IE are not that different.
- Exemplar 'superparticles' in Japanese:
  - Studied by many: Kratzer and Shimoyama (2002), Szabolcsi (2015), Mitrović (2014), Mitrović and Sauerland (2014), among many others.
- We focus on (1c).

(1) 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*
'**every-/any-**one'

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

- Old IE languages fit the templatic pattern above perfectly, with one exception: either the *wh-μ* term is
  i. universal distributive (=⟦each one⟧), or else
  ii. universal distributive (=⟦anyone⟧).
- The semantic 'polysemy' of the Japanese type in (1c) does not obtain in IE.

2 THEORETICAL PRELIMINARIES: A PRAGMATICS-SYNTAX CONSPIRACY

- The theory of grammaticised implicatures (Chierchia et al. 2012; Chierchia 2004; Chierchia 2013; *int. al.*) convincingly contends that the locus of some inherently pragmatic phenomena lies in narrow syntax.
- Following a theory of grammati**ci**sed implicatures, I will suggest that polarity sensitivity may diachronically arise as a grammati**cali**sed implicature.
  - Novel evidence from Japonic shows that the Japanese particle-marked polarity system arose from an (existential) SI in Old Japanese (8th c. AD), which I plot 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.

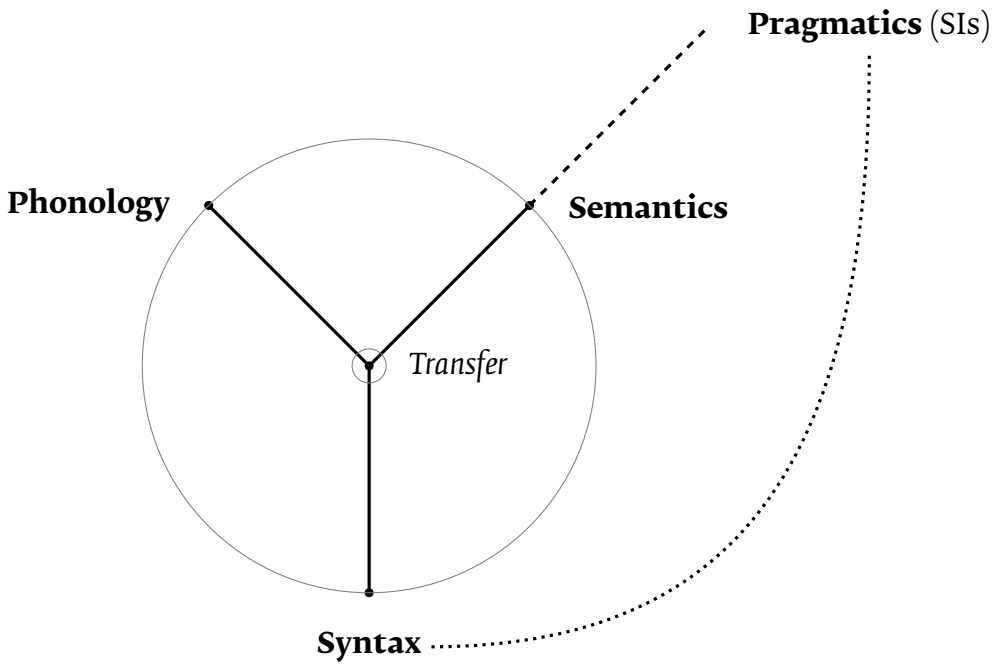


FIGURE 1: *A Y-model of linguistic modularisation, with a pragmatic extension (dashed) and a Chierchian (2013) twist (dotted).*

2.1 The system: Chierchia (2013)

- Alternative-sensitive inferential processes, such as those associated with implicatures (incl. polarity sensitivity, freedom of choice, scalar implicatures (SI)) or focus (Fox and Katzir 2011, *et seq.*), are anchored in feature specifications on syntactic terminals
- Chierchia's (2013) featural makeup: [δ] for subdomain and [*sigma*] for scalar alternatives, and triggered by virtue of an Agree relation between an exhaustification ($\mathfrak{X}$) operator and the [$\pm\delta, \pm\sigma$]-bearing lexical item.

- alternatives ($\mathfrak{A}$) are lexically grounded
  - [σ] scalar alternatives
  - [δ] sub-domain alternatives
- A root-level exhaustifier $\mathfrak{X}$ probes for one or more goals carrying unvalued [σ, δ] features that provide its restriction ($\sigma\mathfrak{A}, \delta\mathfrak{A}$)
- Scalar terms (*or, some*, etc.) carry (unvalued) [σ, δ] features which may be targeted by exhaustifiers
  - [+] active alternatives
  - [−] inactive alternatives
- some lexical items (*any, irgend-*) obligatorily activate alternatives, i.e. its feature specifications cannot be [$-\sigma, -\delta$]
- core component: a syntactically anchored exhaustification operator ($\mathfrak{X}$, or 'silent *only*')

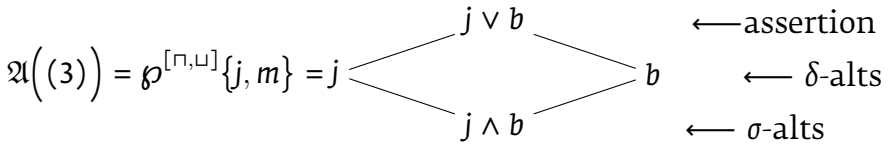
(2) $\mathfrak{X}(p) = p \wedge \forall q \in \mathfrak{A}(p)\Big[[p \nVdash q] \rightarrow \neg q\Big]$
(p is true and no (non-entailed) alternatives (q) to p are true)

2.1.1 An example of the system in action: ambiguous disjunction

- A disjunctive sentence in English always carries an implicature: either an ignorance implicature (3a) or a scalar implicature (SI) (3b):

(3) Mary saw John **or** Bill.
   a. IGNORANCE IMPLICATURE
      i. $\mathfrak{X}_{[\varnothing]}$ [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. $\mathfrak{X}_{\sigma\mathfrak{A}}$ [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**.

(4) Two ways of calculating the SI of (3) and deriving the exclusive component:



i. XOR INCARNATION #1 (*global calculation via* $\mathfrak{X}_\sigma$)
$\mathfrak{X}_{[\sigma\mathfrak{A}]}(j \vee b) = [j \vee b] \wedge \neg[j \wedge b]$

ii. XOR INCARNATION #2 (*local calculation via* $\mathfrak{X}_\delta$)
$\mathfrak{X}_{[\delta\mathfrak{A}]}(j \vee b) = \mathfrak{X}(j) \vee \mathfrak{X}(b) \vdash \neg[j \wedge b]$

3 JAPONIC QUANTIFIER SHIFT

- In Old Japanese (OJ), we can directly observe that the NPI semantics was absent from the original μ particle

3.1 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 is the polar construction absent from the μ-system, but μ^0 subcategorised for scalar hosts only.
  - μ was not only distributive but also inherently scalar.

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

(5) 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)

(6) 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)

	# 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*

(7) ⟦[not [all nights]]⟧ = { ⇝ some nights (scalar reading); ↛ no nights (polar reading) }

- the OJ *μ*-system: [*μ*[*uσ*]]

3.2 Two changes in Classical Japanese

3.2.1 The loss of scalarity & the rise of polarity sensitivity in the Classical Japanese period

- change (#1): LOSS OF OBLIGATORILY SCALAR COMPLEMENTATION:

(8) 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)

- Chierchia's (2013) system predicts that if both [*σ*] and [*δ*] are available, *ceteris paribus*, polarity-sensitivity should obtain.

- That is exactly what we find in non-archaic Japonic.

- change (#2): RISE OF POLARITY SENSITIVITY:

(9) 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)

- The Classical (early middle) Japanese μ-system: $\boxed{\mu[\varnothing]}$ (or allowing both $[\sigma]$- or $[\delta]$-carrying complements).
  - non-scalar hosts with $[\delta]$ specification ⟶ polarity system kicks in automatically as per Chierchia's (2013) system

- Change in inferential procedure due to featural change (grammaticalisation):

(10) a. $[\![[\neg\ \mu\mathrm{P}]_1]\!] \rightsquigarrow$ SI: $\mathfrak{X}_{[\sigma\alpha]}\Big[\neg\big[\ldots[_{\mu\mathrm{P}}\ \ \exists_{[+\sigma]}\ \ \mu]\big]\Big] = \neg > \forall \vdash \neg\forall$

b. $[\![[\neg\ \mu\mathrm{P}]_2]\!] \rightsquigarrow$ NPI: $\mathfrak{X}_{[\delta\alpha]}\Big[\neg\big[\ldots[_{\mu\mathrm{P}}\ \ \exists_{[+\delta]}\ \ \mu]\big]\Big] = \forall > \neg \vdash \neg\exists$

- Diachronic facts from Japonic have bearing on IE $^{\star}kwe$.

4 INDO-EUROPEAN QUANTIFIER SHIFT

4.1 Quantifier shift & two quantifier-particle meanings

- Superparticle meanings consistent throughout early Indo-European—two groups (shaded).

- Table 2 suggests that a quantificational split took place in early IE with regards to the interpretation of the expression containing an indefinite *wh*-word and a conjunctive particle like $^{\star}k^{w}e$.

- There existed two interpretations for the indefinite-particle expression:
  - in one group: $[\![wh\text{-term}+\mu]\!]$ = polar-sensitive ('any');
  - in another group: $[\![wh\text{-term}+\mu]\!]$ = universal distributive ('every/each')

- consequently, two groups of IE languages:
  - the polar group in the other branches ..... (11)
  - the universal group with Hittite, Celtic, Tocharian, Germanic and Latin (12)

(11) i. VEDIC & CLASSICAL SANSKRIT (INDO-IRANIAN)

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

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

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

ii. OLD CHURCH SLAVONIC (SLAVONIC)

a. ⱀⰺⱍⰵⱄⱁⰶⰵ ⱁⱅⱏⰲⱑⱋⱅⰰⰲⰰⰰⱎⰵ
n-**i**-česo-že otŭvěštavaaše
NEG-μ-WH-REL=nothing answer.IMPF.3.SG
'He answered nothing.' (CM Mt. 27:12)

(12) i. LATIN (ITALIC)

a. 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)

ii. GOTHIC (GERMANIC)

a. 𐌾𐌰𐌷 𐍈𐌰𐌶 𐌿𐌷 𐍃𐌰𐌴𐌹 𐌷𐌰𐌿𐍃𐌴𐌹𐌸 𐍅𐌰𐌿𐍂𐌳𐌰 𐌼𐌴𐌹𐌽𐌰
jah [hvaz- **uh**] saei hauseiþ waurda meina
and who.M.SG and *pro*.M.SG hear.3.SG.IND words.ACC.PL mine
'And **every** one that heareth these sayings of mine . . . ' (*Codex Argenteus*, Mt. 7:26)

- even within a single language, Hittite (which was the first to split off the IE core), there is a semantic split:
  - ⟦**-ki**$_\mu$⟧(⟦*wh*-term⟧) = polar-sensitive .... (16a)
  - ⟦**-(y/m)a**$_\mu$⟧(⟦*wh*-term⟧) = universal distributive .... (13)
- no way of knowing which one was the primary function of bare $^\star k^w e$ and $^\star k^w e$-like μ particles

(13) 
nu kuitt-**a** arhayan kinaizz[i
J what-μ = ∀ seperately sifts
'She sifts **everything** seperately.' (KUB XXIV.11.III.18)

- Using comparative diachrony, we compare the IE quantificational split in light of the evidence from Japonic and conclude that universal form was original and that the first (universal) group of languages is thus more archaic and retentive, as is the case in Japanese
- 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.

4.2 The meaning of μ & the differential interpretation

- CLAIM: μ invokes exhaustification
- essentially comes with two semantic functions:
  i. alternative ($\mathfrak{A}$) activations
  ii. obligatory exhaustification via a silent (Chierchian) exh. operator ($\mathfrak{X}$)

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

$$\left[\!\!\left[\begin{array}{c} \mu P \\ \mu^0 \quad XP \end{array}\right]\!\!\right] = [\![\mu]\!]^{M,g,w}\Big([\![XP]\!]\Big)$$
$$= \{[\![XP]\!]\}^{\mathfrak{A}}$$
$$\rightarrow \mathfrak{X}\Big([\![XP]\!]\Big)\Big(\{[\![XP]\!]\}^{\mathfrak{A}}\Big)$$

- the recursive (R above, and below) character of subdomain alternative exhaustification via $\mathfrak{X}$ defined in line with Fox (2007):

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

POLARITY

(16) *Hittite (Anatolian)*
a. nu-wa ÚL [kuit **ki**] sakti
and-QUOT NEG [who μ] know.2.SG.PRES
'You know *nothing* (=not *anything*)' (KUB XXIV.8.I.36)

(17) $\left[\mathfrak{X}_{[\delta\mathfrak{A}]}\left[\text{ You do}\mathbf{n't}\text{ know }[\textit{what-}\mu]\ \right]\right]$ .....=(16a)

a. ASSERTION: $(= p)$
$\forall x \in \mathfrak{D}\left[\textsc{thing}(x) \wedge \neg\textsc{know}(\textsc{you}, x)\right]$

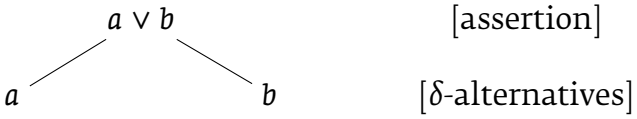
b. $\mathfrak{A}(p) = \left\{\forall x \in \mathfrak{D}'\left[\textsc{thing}(x) \wedge \neg\textsc{know}(\textsc{you}, x)\right] \mid \mathfrak{D}' \subset \mathfrak{D}\right\}$

c. $\mathfrak{X}_{[\delta\mathfrak{A}]}(p) = p$ ($\because$ all alts. entailed under neg.)

DISTRIBUTIVE UNIVERSALS

(18) $[\![\text{who}]\!] = [\![\text{someone}]\!] = \exists x \ldots = a \vee b \vee \ldots$

(19) a. ACTIVE δ-ALTERNATIVES:.....=(12ii-a)



b. EXHAUSTIFICATION:
$\mathfrak{X}^{R}_{[\delta\mathfrak{A}]}(a \vee b) = a \wedge b \quad (\vdash \forall)$

- For a similar implementation and independent arguments, see Bowler (2014) who derives [[and]] from [[or]] in Warlpiri also using recursive exhaustification.

4.3 A view of change: a wider perspective

- Consult split-sketch on final page.

(1) Primary semantic nature of (*)*$k^{w}e$ is puzzling in light of philological evidence of indefinite/*wh*-cognates: perfectly modellable using modern semantics: [[wh]] ↦ [[∃]]. Indefinite core of [[wh]] wrt. its presuppositional contents, is grammaticised into a ∃-quantifier.

(2) The particle is thus an ∃-quantifier. As such, it is subject to scalar shifts, diachronically. One such shift is the 'fossilisation' of the scalar implicature (what I call above 'gramamticalised implicature).

(3) The quantificational force of *$k^{w}e$ is attested in Hittite (research into wider Anatolian currently underway) in its harmonic (modern Japanese-style) form, functioning as an existential quantifier (viz. *kuiš-ki*) or disjunctive morpheme (viz. *-ku*), fully comparable with the *ka* morpheme in Japanese, incarnating both disjunctive and existential structures.

(4) An ∃-quantifier turned into a ∀-quantifier. We have empirical evidence and theoretical accounts of such means of shifts, cf. Bowler (2014), *int. al.*

(5) The harmony breaks down at this point: the particle is conjunctive and indirectly universal wrt. to obligatorily isotonic contexts it may appear in.

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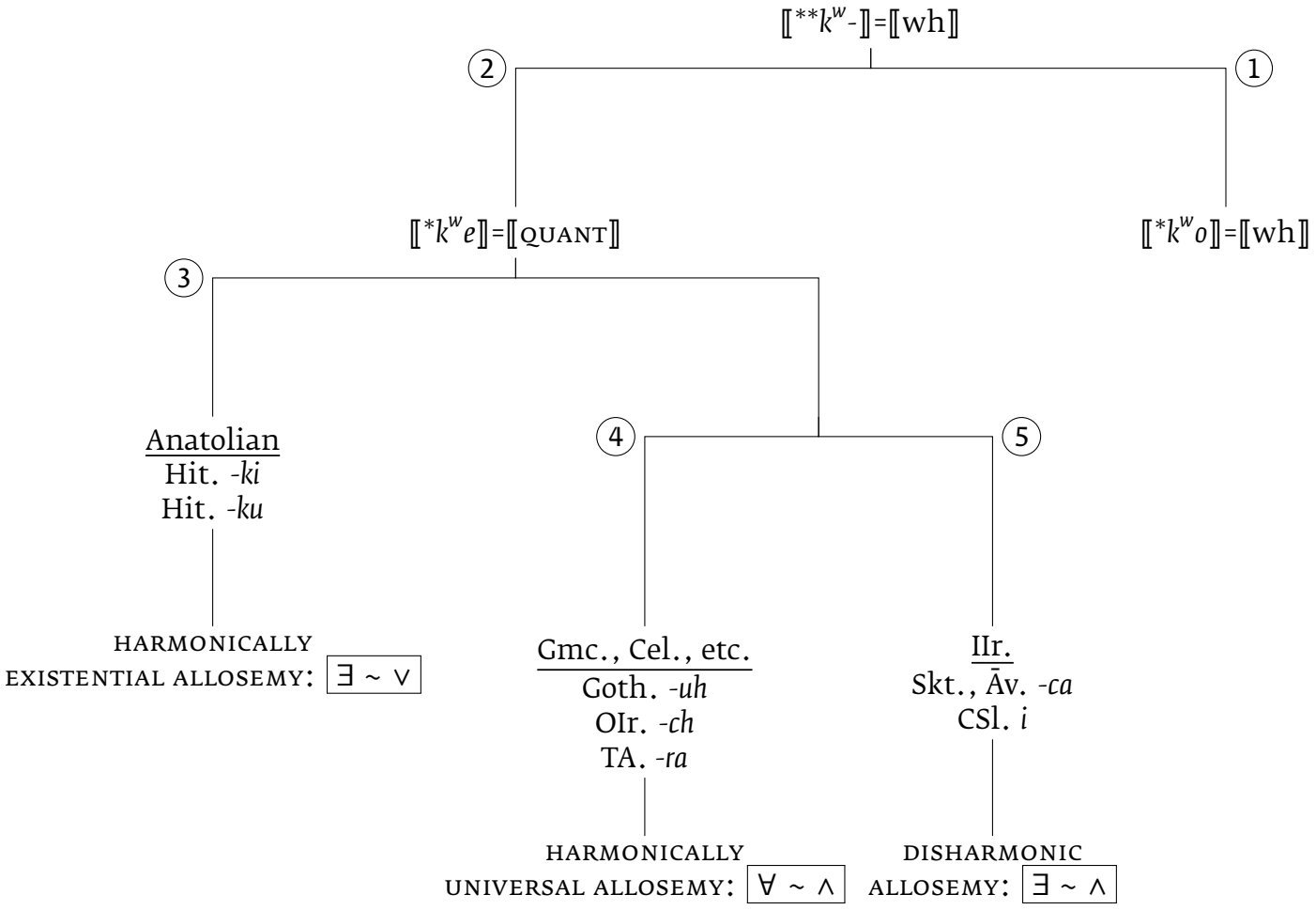
FIGURE. A 5-step semantic-splitting pathway of **kwe*.



A quantifier shift is a logical fallacy in which the quantifiers of a statement are erroneously transposed. The change in the logical nature of the statement may not be obvious when it is stated in a natural language like English. The fallacious deduction is that: For every A, there is a B, such that C. Therefore, there is a B, such that for every A, C. However, an inverse switching: is logically valid. We use quantifiers when we want to give someone information about the number of something: how much or how many. Sometimes we use a quantifier in the place of a determiner: Most children start school at the age of five. We ate some bread and butter. We saw lots of birds. Quantifiers with count and uncount nouns. We can use these quantifiers with both count and uncount nouns: all. some.Â We use the quantifiers every and each with singular nouns to mean all: There was a party in every street. (= There were parties in all the streets.) The * is a meta character, called a quantifier. It means "repeat the previous character or character class zero or more times". In your case, it follows nothing, and is therefore a syntax error. What you probably are trying is to match anything, which is .*: Wildcard, followed by a quantifier. However, this is already the default behaviour of a regex match unless it is anchored. So all you need is The Great Vowel Shift is the name given to a series of changes of long vowels between the 14th and the I8th c. During this period all the long vowels became closer or were diphthongised. The changes can be defined as "independent", as they were not caused by any apparent phonetic conditions in the syllable or in the word, but affected regularly every stressed long vowel in any position. The changes included in the Great Vowel Shift are shown in Table 5 with some intermediate stages and examples.Â And nevertheless the Great Vowel Shift was the most profound and comprehensive change in the history of English vowels: every long vowel, as well as some diphthongs, were "shifted", and the pronunciation of all the words with these sounds was altered.