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1 INTRODUCTION

1.1 Aims & overview

- We propose a morpho-syntactic-semantic analysis of the quantifier particle *jie* 皆 in Ancient Chinese (AC) in relation to quantifier *jin* 盡.
- We try to resolve the following questions:
 - What is the nature of differential universal Quantifiers (Qs) in subject and object positions? (Harbsmeier, 1981: Chap. 2)
 - What is the relation between the distributive quantifier *jie* 皆 and other non-distributive quantifier 盡 in AC?
 - What is the cross-linguistic and diachronic typological connection between *jie* 皆 and quantifier particles in other languages such as Indo-European and Japonic?

1.2 Theoretical assumptions

- We assume the following as ingredients for our account:
 - ① Grammar is modular: a structure building engine, SYNTAX, is elemental: once syntactic structures are built and converging (Chomsky, 1995), they are transferred or ‘sent off’ to the two interfacing modules:
 - * PHONOLOGY where syntactic structures undergo Vocabulary Insertion (VI) (Halle & Marantz, 1994; Embick & Noyer, 1999, 2001; Embick, 2010; Myler, 2014; Bobaljik, 2012) are ultimately converted in Phonological Form (PF)
 - * SEMANTICS where syntactic structures undergo compositional meaning calculation as they converted to Logical Form (LF).
 - ② Transfer is phasally dictated: core syntactic phases (π) are v^0 and C^0 . (Chomsky, 2001)
 - ③ Phases also constrain scope and word-shape

2 GRAMMATICAL ASYMMETRY OF DEPENDENT QUANTIFICATION: 皆 VS 盡

- (1) THE HARBSMEIER GENERALISATION [HG] (Harbsmeier, 1981: 78):
 - a. Quantifier particle *jie* 皆 quantifies the subject. (It may quantify the object only when the subject is unquantifiable.)
 - b. Quantifier particle *jin* 盡 quantifies the object. (It may quantify the subject only when the object is unquantifiable.)

- HG is by no means trivial from a theoretical perspective

- I know of no language that has a doubleton set of dedicated quantifiers for subjects and objects

a. $\llbracket \text{John likes } \mathbf{all}_1 \text{ the girls} \rrbracket = \forall \boxed{X} [\text{GIRL}(\boxed{X}) \rightarrow \text{LIKE}(j)(\boxed{X})]$

b. $\llbracket \mathbf{All}_2 \text{ the girls like John.} \rrbracket = \forall \boxed{X} [\text{GIRL}(\boxed{X}) \rightarrow \text{LIKE}(\boxed{X})(j)]$

- where \mathbf{all}_1 and \mathbf{all}_2 are morphologically distinct given their structural position and interpretational role.

↳ $\llbracket \mathbf{all}_1 \rrbracket = \llbracket \mathbf{jīn} \text{ 盡} \rrbracket$

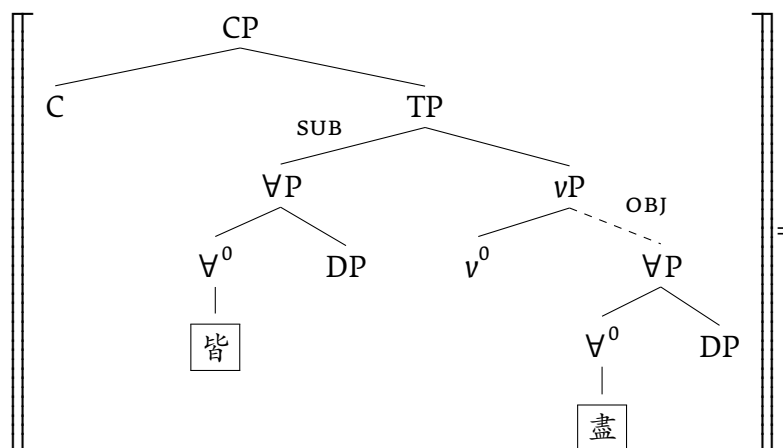
↳ $\llbracket \mathbf{all}_2 \rrbracket = \llbracket \mathbf{jīe} \text{ 皆} \rrbracket$

(2) 百姓 皆 愛 其 上
Baixing **jīe** ai qi shang
people jīe love their superior
'The people all like their superiors.'
(Xun 10.76.)

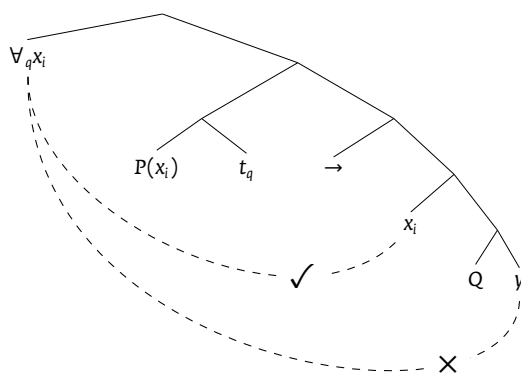
(3) 百姓 盡 殺 其 上
Baixing **jīn** sha qi shang
people jīn kill their superior
'The people killed all their superiors.'
(Harbsmeier, 1981: 80, ex. a)

- We take HG to be an empirically valid observation and provide a theoretical account.
 - We assume *jīe* 皆 is a subject-level \forall^0 triggering rotation (left-ward movement to SPEC(\forall P) of its complement over which constitutes it takes scope.
 - Covertly, the quantifier *jīe* 皆 raises so as to take scope: it binds the variable in the subject position of the nucleus.
 - Obversely, we assume *jīn* 盡 is an object-level \forall^0 over which nuclearly scopes.
 - Covertly, *jīn* 盡 also raises so but binds the variable in the object position of the nucleus.

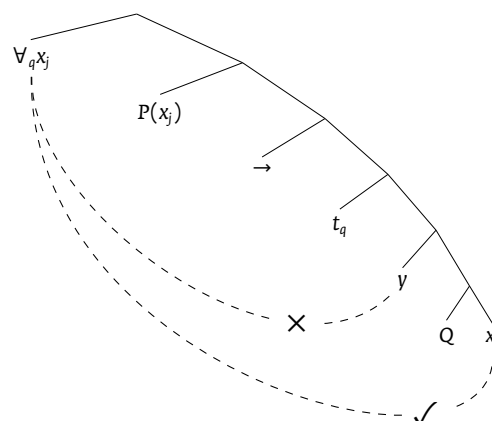
(4) A general sketch of syntactic structure and compositional interpretation:



a. 皆 -quantification:



b. 盡 -quantification:



- (5) 民 各 愛 其 上
 Min ge ai qi shang
 people GE love their superior
 'The people each like their own superiors.' (Harbsmeier, 1981: 80, ex. c)

2.1 The allosemy of 皆 and 盡

- HG translates (in its strong sense, excluding the exception proviso in brackets in 1)

(6) An account of THE HARBSMEIER GENERALISATION:

- 皆 morphologically realises the subject in the quantificational nucleus.
- 盡 morphologically realises the object in the quantificational nucleus.

- Phases delimit scope.

- Marantz (2011, 2012) on phases and interpretation:

(7) It's the structure of the grammar itself that determines the domain of contextual allomorphy: derivation by phase. *So the domain of contextual allosemy should also be the phase.* [emph. mine] (Marantz, 2011, 2012)

(8) $\forall^0 \Leftarrow \{jie, jin\}$

a. $\forall^0 \Leftrightarrow [d_{3ie}] / \left[\text{---} \right]_{C_{nP}}$ (subjecthood condition)

b. $\forall^0 \Leftrightarrow [d_{3in}] / \left[\text{---} \right]_{V_{nP}}$ (objecthood condition)

3 THE DISTRIBUTIVITY PROPERTY: 皆 VS 盡

- Why does 皆 and (盡 does not) force distributivity?
- Can we derive the distributivity property from asymmetry of dependent quantification? Yes.
- How do we encode the distributivity property of 皆?
- We take 皆 to be a governing quantifier in the sense of Milačić et al. 2015 under which the indefinite undergoes skolemisation.

3.1 A solution: skolemisation and dependent quantification

- Intro to theory and skolemisation.
 - (9) two trees with an LF each.
 - (10) Evidence for grammaticised distributivity from Swedish (Milačić et al., 2015: ex. 7):
 - a. **Varje** flicka drack en öl
each girl drank a beer
'Each girl drank a beer.'
 - b. Barnen läste **varsin** bok.
children.the read **each**.poss book
'The children read a book each.'
 - c. Flickorna drack en öl **var**.
girls.the drank a beer **each**
'The girls drank a beer each' → obligatorily distributive
 - (11) ex from hungarian etx.
- Milačić et al. (2015) cite a plethora of cross-linguistic evidence for the grammaticisation of distributivity: East Cree, Russian, SerBo-Croatian, Hungarian, German.
- We take AC 皆 to such a grammaticisation.

3.2 Analysis: obtaining distributivity

- AC structures under discussion are of the form $[\forall\exists]$ and as such are potentially ambiguous between a collective and a distributive reading – in presence of a subject-oriented 皆 quantifier, only the distributive reading is available.
- Following Milačić et al. (2015), we assume the $[\forall\exists]$ form to be the generated LF but that such an LF may be strengthened via skolemisation, i.e., turning it into a Skolem Normal Form.
 - We make the denotation of the indefinite *dependent* on the universal.
- (12) SKOLEMISATION OF $[\forall\exists]$
 - a. $[[\text{Every boy lifted a table}]] = [\forall x : \text{BOY}(x)][\exists y : \text{TABLE}(x)](\text{LIFTED}(x)(y))$
 - b. $[[\text{Each boy lifted a (different) table}]] = \boxed{\exists f}[\forall x : \text{BOY}(x)](\text{LIFTED}(x)(\boxed{f(x, \text{TABLE})}))$
- We assume an indefinite (objects in 皆-structures) denotes a variable-arity Skolem function.
 - When 皆 is not present, the arity of the Skolem term (object) is 0 and a standard interpretation applies.
 - When 皆 is present, positive arity of the Skolem term is licensed by the governing quantifier 皆 and an enriched interpretation obtains.
- What about *ge* 各?
- *Ge* 各 is marks the Skolem variable left behind, analogous to the binominal English *each* (Milačić et al., 2015), Slavonic *po* or the reduplicant morphemes in Hungarian.
- This explains why { 皆, 各 } can co-occur but why 皆 does not occur in tandem with collective predicates (like *qi* 齐).

3.3 Additional evidence: quantifying over mass terms

- 皆 cannot but 盡 can quantify over mass terms.

(13) 姦 盡 止
Jian **jin** zhi
wicked JIN stop

- All the wicked people.
- All wickedness stops.

(HF46 / 322.6; Harbsmeier 1981: 80)

(14) 姦 皆 止
Jian **jie** zhi
wicked JIE stop

- All the wicked people stop [their activities].

b. never: All wickedness stops.

- Why? ∴ 皆 is inherently distributive – mass terms cannot be Skolemised.

3.4 Exceptions to HG

- What about exceptions to HG?

(15) 宋 人 皆 醢 之
Song ren **jie** hai zhi
Song people JIE stew pro
'The people of Song stewed them all.'
(Zuo Zhuang 12.5.)

(16) 汝 皆 说 之 乎
ru **jie** shuo zhi hu
you JIE enjoy pro Q
'Do you enjoy all these things?'
(Zhuang 2.16.; Harbsmeier 1981: 78, ex. 1)

(17) 孙子 皆 杀 之
Sunzi **jie** sha zhi
Sunzi JIE kill pro
'Sunzi killed them all.' (Zuo Xiang 14.4.)

(18) 皆 赏 之
Jie shang zhi
JIE rewarded pro
'[And] he rewarded them all' (Zuo Ding 3 fu 1.)

- Object 皆 -quantifications are consistently leftward and subject-directed.
- Scope shifts rightward and is object directed when the subject is unquantifiable (=HG).
- How do we derive this?
- We assume the subject is covertly existentially quantified over, hence 皆 cannot quantify over the subject.
- The only other argument that is available for quantification is the object.
- We predict Skolemisation of the object in such cases to be impossible and hence no distributivity should arise.
- This is confirmed, cf. (15-18).
- Other options exist for exploring the distributive nature of 皆:
 - Chierchia (2013) proposes an exhaustification approach which has been applied to quantifier particles by Mitrović (2014) (for Japonic and Indo-European) and Xiang (2016) (modern Mandarin).
 - We could (should!?) harwire 皆 with subsethood meaning (Mitrović & Sauerland, 2014, 2016) so as to obtain comparative parallels with the Japonic and Indo-European branches.

4 DIACHRONIC TYPOLOGY: A SUPERPARTICLE VIEW OF 皆 FROM INDO-EUROPEAN AND JAPONIC

(19) 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. \forall 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’

(20) The κ -series (ka/か)

a. DISJUNCTION

ビル(か)メアリーか
 Bill **ka** Mary **ka**
 B κ M κ
 ‘(either) Bill **or** Mary.’

b. QUESTION

分かるか?
 wakaru **ka**
 understand κ
 ‘Do you understand?’

c. \exists QUANTIFICATION

- i. 誰か
 dare **ka**
 who κ
 ‘**someone**’
- ii. どの学生か
 dono gakusei **ka**
 INDET student κ
 ‘**some** students’

$$(21) \bigwedge_{x \in \{r_1, \dots, r_n\}} P(x) \Leftrightarrow P(r_1) \wedge \dots \wedge P(r_n)$$

5 DIACHRONIC SEMANTICS OF ANCIENT CHINESE 皆, AND μ SUPERPARTICLES GENERALLY

- The JP and IE families show a diachronic rise of polar-sensitive μ .

(22) 皆 AS NEGATIVE POLARITY MARKER?:

夫美也者上下内外小大远近皆无害焉
 Fu [mei] ye zhe shang xia, nei wai, xiao da yuan jin, **jie** wu hai yan
 FU beauty YE ZHE, up down in out small big far near JIE [not harm] YAN
 ‘For beauty, it will not do any harm whether it be up or down, inside or outside,
 small or big, far away or nearby.’

(Guo Shu 国书, cca. 4c. BCE)

- The JP and IE families also show a development of conjunction systems from such quantifier particles.

(23) 皆 AS CONJUNCTION MARKER?:

弥与纆吾皆爱之
 Mi yu Ge wu **jie** ai zhi
 Mi and Ge my JIE love pro

I love both Mi and Ge. (Zuo Xiang 23.11.; Harbsmeier 1981: 78, ex. 3)

- (24) 夫仁 礼 勇 皆民 之 为也
 Fu [ren li yong] **jie** min zhi wei ye
 FU benevolence ritual courage JIE people pro/POSS do YE

‘Benevolence, ritual and courage are (all) what people do’.

(Guoyu 国语, cca. c. 4c. BCE)

- The μ particle in all three families eventually ended up with a quantificational type of its hosts, i.e. $\langle\langle e, t \rangle, t\rangle$ (This seems to be in line with Aldridge (2006, 2007))

- (25) 百姓 皆爱其上
 Baixing **jie** ai qi shang
 people JIE love their superior

‘All the people like their superiors.’ (Xun 10.76.)

- (26) a. [Shui] (**dou**) he -guo jiu.
 who DOU drink -EXP alcohol

‘Anyone/everyone has had alcohol.’

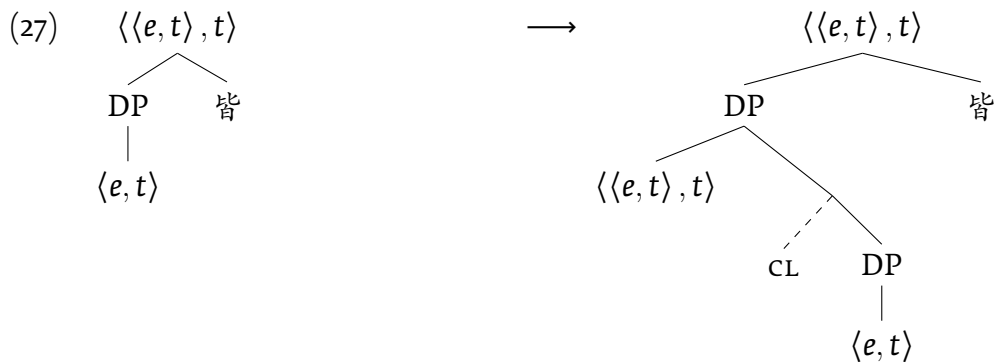
(Xiang, 2016: 3, ex. 5a)

- b. [Na-ge nanhai] *(**dou**) he -guo hejiu.
 which-CL boy DOU drink -EXP alcohol

‘Any/Every boy has had alcohol.’

(Xiang, 2016: 3, ex. 5b)

- The discrepancy in the internal QP structure seems to reduce to the following diachronic development (*pace* Chierchia 1998 with respect to \llbracket CL \rrbracket —irrelevant here):



6 CONCLUSION & OUTLOOK

- We contended that the two quantifiers *jie* and *jin* are allosemantic variants of the same underlying universal QUANT.
- We appreciated HG and shown that AC universal quantification is unique and what challenges that empirical uniqueness poses to theoretical linguistics.
- We proposed how two seemingly facts about *jie* and *jin* may be accounted for.
- Having assumed that the \forall -LF is the default for both quantifying strategies, we are able to retain the unique analysis of AC grammar of distributivity with key semantic ingredients required to explain other universal quantifier particles and their semantic evolution.

	Indo-European		Japonic		Chinese	
	Hittite	Sanskrit	OJ	Cl/MdJ	AC	MdM
inherent distributivity μ hosts	+	+	+	+	+	+
NPI μ -formation	–	+	–	+	(–)	(–)
scalar additivity (EVEN)	+	+	+	+	–	+
non-scalar additivity (ALSO)	+	+	–	+	–	–
conjunction	+	+	–	+	–	–
obligatory type-lift of μ hosts for QUANT. terms	+	+	–	+	–	+

TABLE 1: Some comparative and diachronic-semantic parameters for IE, JP, and AC

SELECTED REFERENCES

- Aldridge, Edith. 2006. *Wh-in situ and the Emergence of Wh-variables in Chinese*. Paper presented at the *International Conference on East Asian Linguistics*. University of Toronto.
- Aldridge, Edith. 2007. *Wh-indefinites and their relation to Wh-in situ*. In M. Elliott, J. Kirby, O. Sawada, E. Staraki S. & Yoon (eds.), *Proceedings of the 43rd Meeting of the Chicago Linguistics Society*, vol. 2, 139–153.
- Bobaljik, J. D. 2012. *Universals in Comparative Morphology: Suppletion, superlatives, and the structure of Words*. Cambridge, MA: MIT Press.
- Chierchia, G. 2013. *Logic in Grammar: Polarity, Free Choice and Intervention* Oxford studies in semantics and pragmatics 2. Oxford: Oxford University Press.
- Chierchia, Gennaro. 1998. Reference to kinds across languages. *Natural Language Semantics* 6. 339–405.
- Chomsky, Noam. 1995. *The Minimalist Program*. Cambridge, MA: MIT Press.
- Chomsky, Noam. 2001. Derivation by Phase. In M. Kenstowicz (ed.), *Ken Hale: A Life in Language*, 1–52. Cambridge, MA: MIT Press.
- Embick, D. 2010. *Localism versus Globalism in Morphology and Phonology*. Cambridge, MA: MIT Press.
- Embick, D. & R. Noyer. 1999. Locality in Post-Syntactic Operations. *MIT Working Papers in Linguistics* 34. 265–317.
- Embick, D. & R. Noyer. 2001. Movement operations after Syntax. *Linguistic Inquiry* 32. 555–595.
- Halle, Morris & Alec Marantz. 1994. Some key features of Distributed Morphology. *MIT Working Papers in Linguistics* 21. 275–288.
- Harbsmeier, Christoph. 1981. *Aspects of Classical Chinese Syntax* (Scandinavian Institute of Asian Studies 45). Odense: Curzon Press.
- Marantz, A. 2011. Locality Domains for Contextual Allosemy. Paper presented at the Columbia Linguistic Society.
- Marantz, A. 2012. Locality Domains for Contextual Allomorphy across the Interfaces. In O. Matushansky & A. Marantz (eds.), *Distributed Morphology Today*, 95–115. Cambridge, MA: MIT Press.
- Milačić, Dejan, Raj Singh & Ida Toivonen. 2015. On the morphosyntactic representation of dependent quantification: distance distributivity, dependent indefinites, and Skolemization. In Eva Csipak & Hedde Zeijlstra (eds.), *Sinn und Bedeutung*, vol. 19, 411–425.
- Mitrović, Moreno. 2014. *Morphosyntactic atoms of propositional logic: a philo-logical programme*: University of Cambridge dissertation.
- Mitrović, Moreno & U. Sauerland. 2014. Decomposing coordination. In Jyoti Iyer & Leland Kusner (eds.), *Proceedings of NELS 44*, vol. 2, 39–52.
- Mitrović, Moreno & Uli Sauerland. 2016. Two conjunctions are better than one. Submitted ms. under review. University of Graz and ZAS, Berlin.
- Myler, Neil. 2014. *Building and Interpreting Possession Sentences*: New York University dissertation.
- Xiang, Yimei. 2016. The Mandarin Particle *dou*: A Pre-exhaustification Exhaustifier. In Christopher Piñón (ed.), *Empirical Issues in Syntax and Semantics*, vol. 11, Paris: Colloque de Syntaxe et Sémantique à Paris (CSSP).