

# MODELLING AND SIMULATING THE ROLE OF REGISTER VARIATION IN SEMANTIC CHANGE

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*Joint work with Uli Sauerland & Richard WALTERIT*

- We report on the preliminary results and the general outlook of a project that aims to combine formal theoretical models with third-wave variationism, contending that register drives of diachronic compositional change
- Drivers of language change – likely a cocktail of several factors acting in concert:
  - grammar-**internal** pressures (Roberts, 2007; Roberts and Roussou, 2003)
  - grammar-**external** pressures: parsing ambiguous utterances (Clark and Roberts, 1993; Yang, 2000), production biases as affecting the shape of change (Kauhanen and Walkden, 2017).
- We contend that social structure, too, drives change: the central notion being **register**

- Register is a variety of language used for a particular purpose or particular communicative situation
  - ...it is defined as “those aspects of socially recurring intra-individual variation that are influenced by situational and functional settings” (p. 3)

- Register shifts can be observed as linear shifts along scales of situational parameters, such as (in)FORMALity (a→c), itself a cluster to be unpacked:

(1)  $\text{FORMAL}(a) > \text{FORMAL}(b) > \text{FORMAL}(c)$

- a. Oh dear!
- b. Jeez!
- c. Fuck!

- We adopt a heuristic of starting our study with a preliminary low-resolution binary classification of historical texts into formal and informal.

- We incorporate a third-wave variationist approach in modelling diachronic change as register-driven.
- Our project sets three core hypotheses:
  - ① The availability of and choice between competing expressions of logical meaning (e.g., conjunction) is register-dependent.
  - ② The smaller the locality domain of a compositional unit, the more retentive its meaning is in time.
  - ③ The *Constant Rate Effect* of historical change holds relative only to a single register.

# PRELIMINARY RESULTS

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LOGICAL VOCABULARY IN INDO-EUROPEAN

## The 1st Position (1P) marker

(2) Arpineius **et** Iunius  
 Arpineius et Iunius  
 'Arpineius et Iunius' (BG:5:28)

(3) ego **kai** Odysseús  
 I and Odysseus  
 'I and Odysseus' (Il L:772)

(4) hotrám **utá** potrá<sup>m</sup>  
 cleanser and presenter  
 'cleanser and presenter' (RV 1:76)

$\chi^{max}$  CONJ  $\gamma^{max}$

## The 2nd Position (2P) marker

(5) vayav-indraś-**ca**  
 Vayu Indra and  
 'Vayu and Indra' (RV 1:2)

(6) deimos **te** phobos **te**  
 terror and flight and  
 'terror and flight' (Il L:37)

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

$\chi^{max}$  (CONJ)  $\gamma_i^{min}$  CONJ  $\gamma_i^{max}$

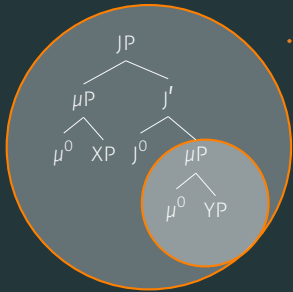


- To the exclusion of the 1P marker, the 2P particle may not only express conjunction, but also other logical meanings, such as quantification (existential or universal, family-dependent) – a Latin exemplar
  - *que* as [[AND]] when it combines two DPs (XPs)
  - *que* as builder of [[EVERY]] when it combines a single indefinite whP

(8) quis- *que*  
who QUE  
'each'

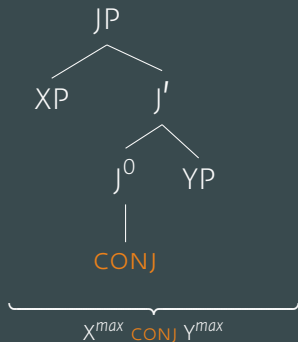
- The double semantic profile of the 2P marker is not accidental, nor rare
- **67%** of world's living languages use the same marker to express conjunction and other logical meanings (e.g., quantifiers), just like in archaic IE.

	quis-	que	← Latin
	kaś-	ca	← Sanskrit
	dare-	mo	← Japanese
(9)	aar-	um	← Malayalam
	↑	↑	
	who	μ-ptc	
	'everyone', 'anyone'		

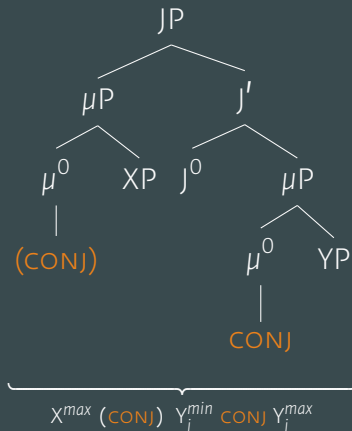


- These  $\mu$ -particles show that expressions of conjunctions can involve a rich underlying structure, featuring two semantically distinct formatives:
  - a quantificational 'inner' layer, headed by  $\mu^0$ , and
  - a 'junctional outer' layer, headed by  $J^0$ , and
- One locus of variation: does the grammar allow for  $\mu$ -particles to express conjunction?
  - since  $J^0$  alone can express conjunction (but not the other logical meanings which  $\mu$  can build).

## The 1st Position (1P) marker



## The 2nd Position (1P) marker



## The 1st Position (1P) marker

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(12) hotrám **utá** potrám  
 cleanser and presenter  
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$\chi^{max}$  CONJ  $\gamma^{max}$

## The 2nd Position (2P) marker

(13) vayav- indraś- **ca**  
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$\chi^{max}$  (CONJ)  $\gamma_i^{min}$  CONJ  $\gamma_i^{max}$

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$X^{max}$  CONJ  $Y^{max}$

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$X^{max}$  (CONJ)  $Y_i^{min}$  CONJ  $Y_i^{max}$

## WHAT DROVE THIS UNIFORM LOSS?

- All branches lost, at different and relative times, the 2P logical particle that can both conjoin and build quantifiers.
  - There is evidence for a grammar-**internal** pressure to retain diachronically the simpler structure
  - Novel evidence: the **external** factor of register plays a role, too.
- Finding coarse register variation in archaic IE:
  - Most of the archaic languages, in their earliest attestation, are constituted by formal registers: e.g., legal documents, religious texts, epic narratives, etc.
  - To pilot our theory that register plays a role in diachronic change, we look at Latin which boasts texts in a rich range of registers

# LATIN ACROSS REGISTERS

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(16)

P. PRO  
 PESI  
 (VIVIS)  
 VERPES  
 QVIVIS  
 IVL  
 LEGES  
 NOTA  
 FIDEN  
 TER  
 SCRIPT

(17)

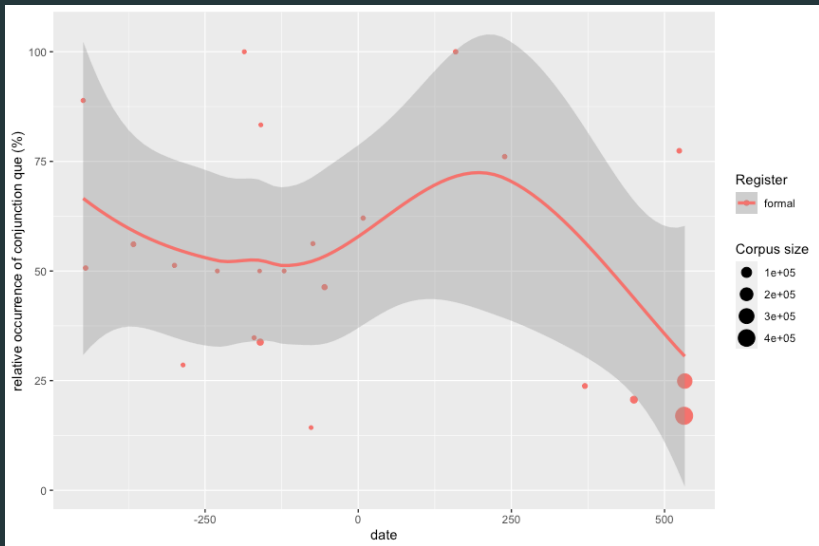
*P(ubli) Pro=  
 pesi  
 cuntus.  
 Verpa  
 que (:quae)  
 is=  
 tuc  
 leges.  
 (:vacat)  
 Non es  
 fiden=  
 ter,  
 script=  
 o (:scriptor)  
 ((:PHALLUS))*

(18)

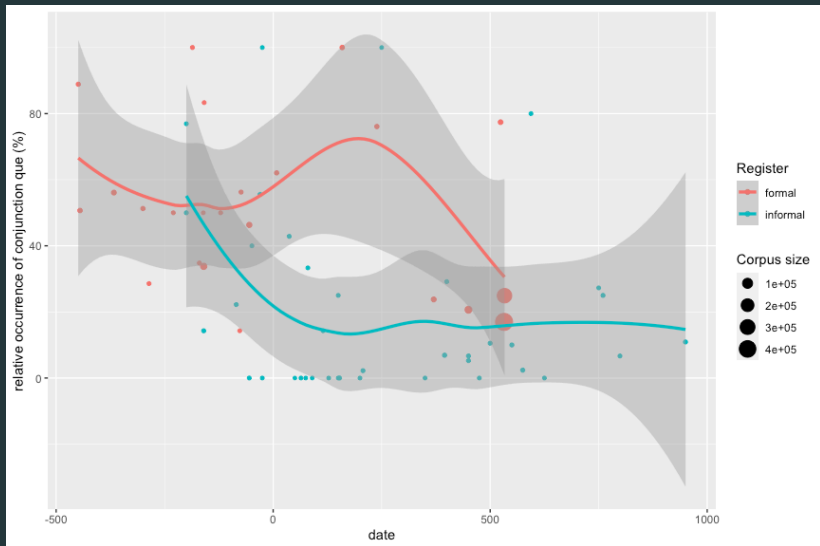
Publius  
 Propesius,  
 jerk. You  
 who read  
 this are a  
 prick. – You  
 are not  
 trustwor-  
 thy, writer.  
 (DRAWING  
 OF A  
 PHALLUS)

- Informal Latin provides a perfect window into whether (and, if so, how) register and language change are connected
- Our pilot study of the historical semantics of Latin conjunction is based on the corpus we compiled in-house, containing both formal and informal (cca. 11k tokens) texts, spanning 15 centuries

# AN FORMAL HISTORY OF CONJUNCTIVE *que* IN LATIN



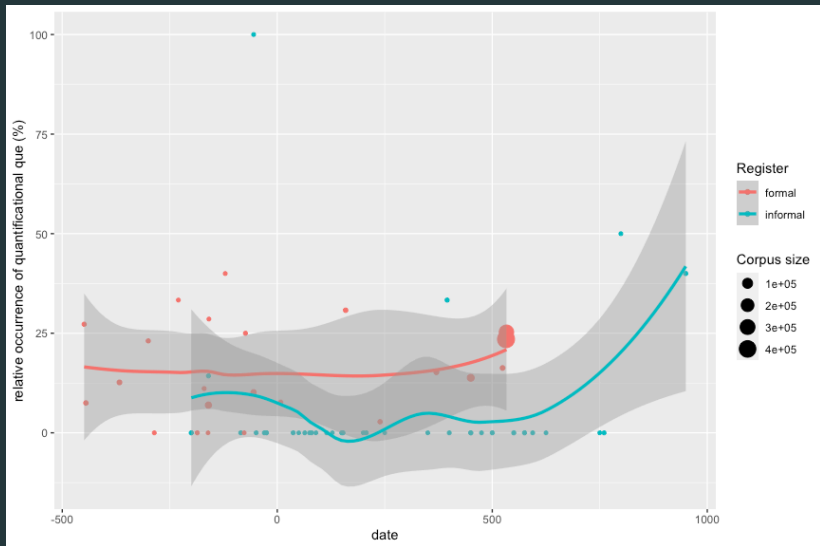
# AN IN/FORMAL HISTORY OF CONJUNCTIVE *que* IN LATIN



## ON THE INCONSTANT RATE EFFECT

- Kroch's (1989) Constant Rate Effect (Hypothesis) states that **when grammar competition leads to language change, the rate of replacement is the same in all contexts affected by the change.**
  - ∴ a change should proceed and permeate the entire grammar at a constant rate
- We identify three exceptions to this theory, while up-cycling and dubbing it the *Inconstant Rate Effect*:
  - 1 The history of formal Latin alone shows a non-logical diachronic behaviour, deviating from the S-curved shape of change.
  - 2 'lower' registers do not reflect the changes observed in the 'higher' ones (H<sub>3</sub>)
  - 3 a form persists through time at different rates in different grammatical context (H<sub>2</sub>)

# AN IN/FORMAL HISTORY OF QUANTIFICATIONAL *que* IN LATIN



## CONCLUSION & DISCUSSION

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MODELLING & PROJECT OUTLOOK



- The preliminary results are consistent with our hypotheses – register plays a role in language change:
  - different registers change at different rates
  - different grammatical units are differently susceptible (or immune) to change

- The required model must be able to capture these and also the more general facts – we pursue constructing two complementary models to this end, assuming that in tandem they will provide an explanatorily adequate account:
  - **the grammatical dimension**: a formal theoretical model based on an e-language incorporating generative theory (currently underway: Mitrović, 2024)
  - **the social dimension**: following Newberry et al. (2017) and Burnett (2023) in adapting a game-theoretic model of register-reflective social interactions

- Incorporating wider **diachronic** evidence: can the variation in quantifier uses vs. conjunction uses be observed across other branches, and can it be traced to register?
- Simulating the model interaction on **synchronic** data by looking for real-time change-in-progress:
  - Analysing large-scale archival Twitter/X data for living languages that have a QUE-type system of logical marking.
  - Will a compositionally more complex expression of conjunction have a social meaning (register) attached to it?

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