

GROTE TAALDAG 2019

A Form-driven Cross-linguistic Study of European Tenses and Mandarin Aspects

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UTRECHT UNIVERSITY (UIL OTS)



Classical Tense & Aspect Theory

Two different ways of time observation

Tense

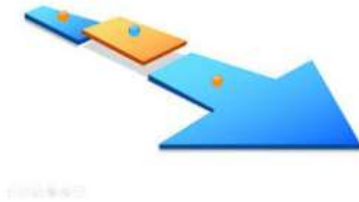
Aspect

Tense: R & S relation

Past: R-S

Present: R,S

Future: S-R



Past/Present/Future

Tense-prominent languages
(English, Dutch, French...)



Imperfective

Aspect-prominent languages
(Mandarin...)



Perfective

Aspect: E&R relation

Imperfective: $R \subseteq E$

Perfective: $E \subseteq R$

- Event time (E), Speech time (S), Reference time (R) (Reichenbach 1947, Klein 1994)
- Insufficient to distinguish European tenses (Klein 2000, Altshuler 2014)

Problems with English Simple Present Tense

English simple present tense is not “very present”

-Sports Report: report PAST events.

(Smith *passes* to David, David to Lucas—and Harris *intercepts*)

-Scheduled Plan: talk about FUTURE events (The train *leaves* tomorrow morning.)

-Habitual usage: used for things not happening at speech time

e.g. John *smokes*.

Problems with Russian Imperfective Aspect

Ja **otkry-l** okno.
I PFV.open-PST window
'I (have) opened the window.'

Ja **otkr-yva-l** okno.
I open-IPF-PST window
'I (have) opened the window.'

-Russian imperfective aspect can express complete events.

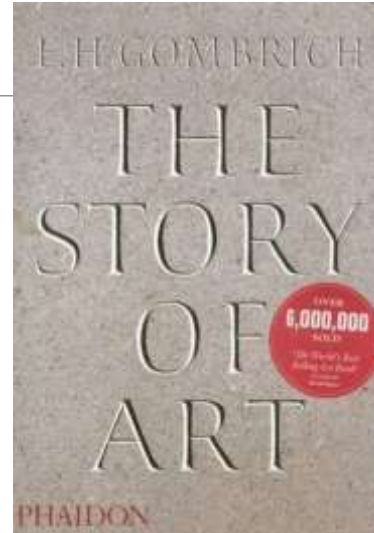
Problems We Face

- “There really is no such thing as Art. There are only artists.”

- E.H Gombrich

-There seems no simple thing as PAST/PRESENT/FUTURE Tense or PERFECTIVE/IMPERFECTIVE aspect. There are only tenses and aspects.

- Moreover, some languages do not have morphological tenses at all, like Mandarin...



Mandarin Aspect Forms

(I) Perfective Aspect Forms (Xiao & McEnery, 2004: 171):

- **Le1** (post-verbal le): actual marker, *chi-le-fan* ‘eat-PFV-meal’.
- **Le2** (post-sentential le): change-of-state marker, *Ta si-le* ‘He-die-PFV’ .
- **Guo**: experiential marker, *kan-guo* ‘see-PFV’.
- **RVC**: completive marker, structure ‘bare verb form + resultative complement (verb/adj.)’, *xie-hao* ‘write-done’, *chi-wan* ‘eat-finish’. The resultative complement indicates the result of the action.
- **Unmarked duplication**: delimitative marker. Bare verbal form is duplicated, *wen-wen* ‘ask-ask’, expressing actions happening within short time.

Mandarin Aspect Forms

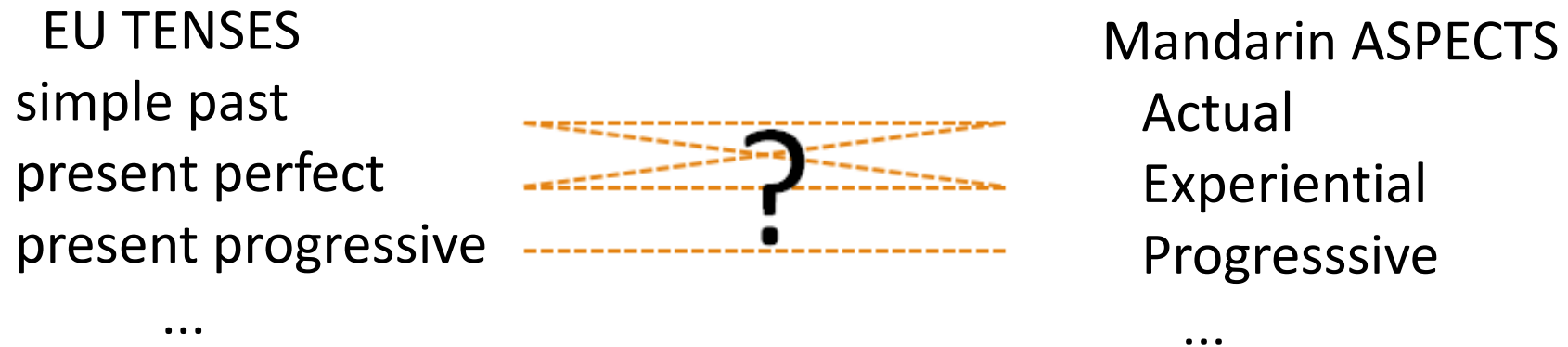
(II) Imperfective Aspect Forms (Xiao & McEnery, 2004: 240):

- **Zhe**: a progressive/state marker, *baoliu-zhe* ‘keep-IPV’, *wo-zhe* ‘hold-IPV’.
- **Zai**: a progressive marker, *zai-jixu* ‘PROG-continue’, *zai-hengheng* ‘PROG-hum’.

(III) Zero Form (Xiao & McEnery, 2004: 240)

- **Unmarked verb**: bare verb form, e.g. *shuo* ‘say’, and *xunzhao* ‘look for’.
Ambiguous, perfective or Imperfective, dependent on context.

Research Questions

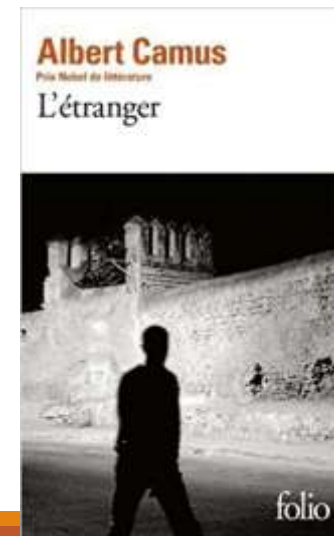


- Are there universal temporal notions? If yes, what are they?
- How are the different tense notions expressed in a morphologically tenseless language like Mandarin?
- What are the similarities and differences between the temporal systems of tense-prominent European languages and aspect-prominent Mandarin?

Parallel Translation Corpus Study

- “Universal Question” → Identify frequent temporal notions from empirical data.
- Parallel translation corpuses (embedded in UU 'Time in Translation' Project):
 - 5 European languages (English, French, German, Dutch, Spanish)
+ Mandarin
- Source Text:
 - L'Étranger* (by Camus) dataset (3 chapters, 536 contexts)
 - 1 Context has 1 French tensed verb
- Target Texts: translations in the other 5 languages

Time in Translation
The semantics of the PERFECT



NWO | Netherlands Organisation
for Scientific Research

 Universiteit Utrecht

Verbal Tense/Aspect Form Annotation

French

imparfait 1.xml

C' **était** vrai .

Translations

German

Präteritum 

Das **stimmte** .

English

simple past 

It **was** true .

Spanish

pretérito imperfecto 

Era cierto .

Dutch

ovt 

Dat **was** waar .

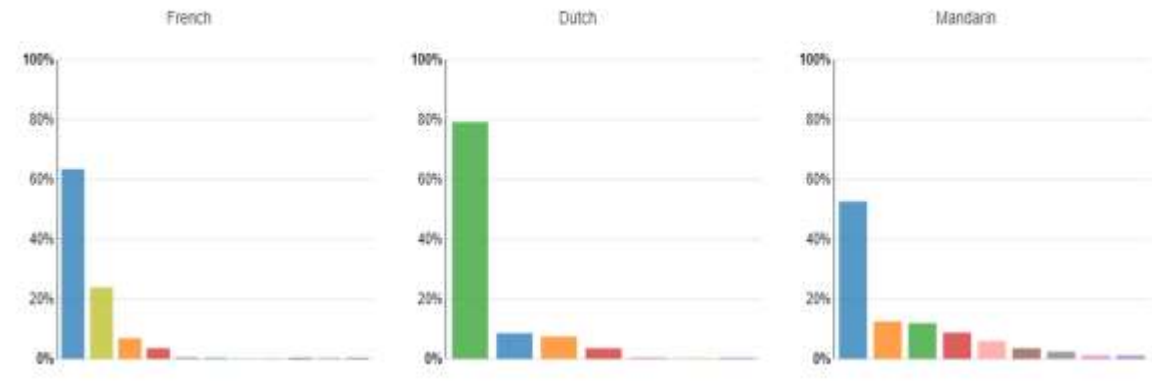
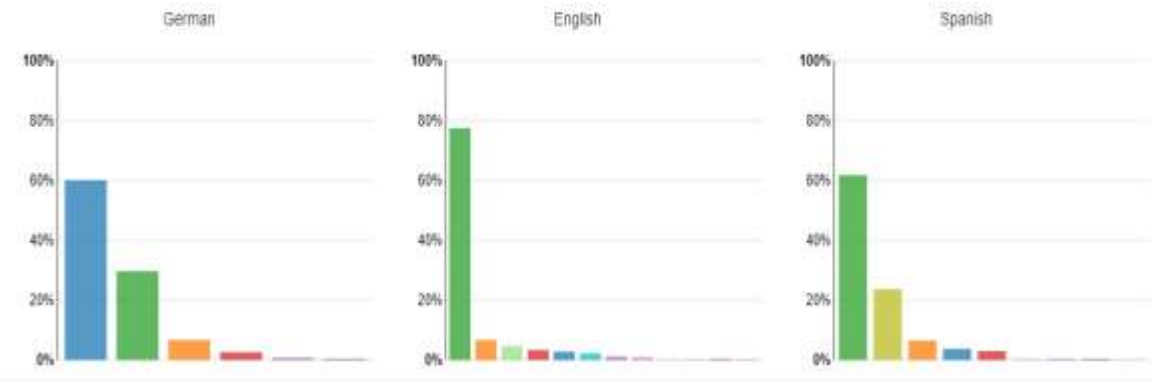
Mandarin

unmarked  

这是真的。

One context annotation example from *L'Étranger*

Descriptive statistics for Camus - all tenses - 5 EU Languages, Mandarin



Tense	Count
Perfekt	322
Präteritum	159
Präsens	36
Plusquamperfekt	14
Futur I	4
Futur II	1

Tense	Count
simple past	415
simple present	36
past continuous	25
past perfect	18
present perfect	15
present participle	12
simple future	6
future in the past	5
future in the past continuous	1
future continuous	1
future perfect	1
past perfect continuous	1

Tense	Count
pretérito indefinido	331
pretérito imperfecto	127
presente	35
pretérito perfecto compuesto	20
pretérito pluscuamperfecto	16
futuro próximo	3
futuro imperfecto	2
futuro perfecto	1
infinitivo	1

Tense	Count
passé composé	340
imparfait	128
présent	37
plus-que-parfait	19
futur simple	3
passé simple	2
conditionnel présent	2
futur proche	2
conditionnel passé	1
futur proche du passé	1
futur antérieur	1

Tense	Count
ovt	424
vtt	46
ott	40
vvt	19
ovtt	3
infinitief	3
ottt	1

Tense	Count
unmarked	282
rvc	67
le1	64
le12	47
non-verb	32
zhe	19
unmarked duplication	13
zai	6
guo	6

Tense Tuple

- In the translation of a particular context type certain tense forms often co-occur.

Context type:
narration of event(s)...

passé composé (F), simple past (E), perfekt(G) ,
pretérito indefinido (S), and o.v.t(D)

- Such a frequent co-occurrence of tenses is named as a **tense tuple**.

A tense tuple: <Tense A (Fr),Tense B(En), Tense C (Gr),Tense D(Sp),Tense E (Dt)>

< passé composé (F), simple past (E), perfekt(G) , pretérito indefinido (S), o.v.t(D)>

- Top 5 most frequent tense tuples in Camus dataset
- For brief, a **tense tuple** is named according to the characteristics of the context type it is associated to/the tenses it includes.

Tense Tuple 1: Nart 1

(1) **Narrative 1** (Top 1, 267 in frequency, dubbed **Nart 1**):

German	English	Spanish	French	Dutch
perfekt	simple past	pretérito indefinido	passé composé	o.v.t.

This tuple often appears in typical narrative context which perceives a complete event:

Context No.24866

Er hat mir einen Stuhl gegeben und hat sich selbst etwas hinter mir hingesetzt . [perfekt]

He offered me a chair and then he sat down just behind me . [simple past]

Me ofreció una silla y él mismo se sentó un poco detrás de mí . [pretérito indefinido]

Il m' a donné une chaise et lui-même s' est assis un peu en arrière de moi. [passé composé]

Hij gaf mij een stoel en nam zelf een eindje achter mij plaats . [o.v.t.]

Tense Tuple 2: Pt Impf

(2) **Past Imperfective** (Top 2, 86 in frequency, dubbed **Pt Impf**):

German	English	Spanish	French	Dutch
Präteritum	simple past	pretérito imperfecto	imparfait	o.v.t.

The tuple usually appears in contexts which describe a past stative or habitual eventuality:

No. 31992

In den ersten Tagen im Heim weinte sie oft . [präteritum]

She cried a lot the first few days at the old people 's home . [simple past]

Los primeros días de su estancia en el asilo , lloraba con frecuencia . [pretérito imperfecto]

Dans les premiers jours où elle était à l' asile , elle pleurait souvent . [imparfait]

De eerste dagen in het gesticht hilde zij dikwijls . [o.v.t.]

Tense Tuple 3: Present

(3) **Simple Present** (Top 3, 26 in frequency, dubbed **Present**)

German	English	Spanish	French	Dutch
Präsens	simple present	presente	présent	o.t.t.

This tuple always appears in contexts which describe an eventuality holding at the reference time of the sentence in question (a prototypical European present tense?):

No. 31952

Das Altersheim ist in Marengo , achtzig Kilometer von Algier entfernt . [Präsens]

The old people 's home is at Marengo , fifty miles from Algiers . [simple present]

El asilo de ancianos está en Marengo , a ochenta kilómetros de Argel . [presente]

L' asile de vieillards est à Marengo , à quatre-vingts kilomètres d' Alger . [présent]

Het oude-mannen-en-vrouwenhuis is in Marengo , tachtig kilometer van Algiers . [o.t.t.]

Tense Tuple 4 : Pt Cont

(4) **Past Continuous:** (Top 4, 24 in frequency, dubbed **Pt Cont**)

German	English	Spanish	French	Dutch
Präteritum	past continuous	pretérito imperfecto	imparfait	o.v.t.

The tuple is characteristic of a past eventuality, either dynamic or stative, is ongoing at the reference time.

No. 32090:

Ich konnte nicht sehen , was sie machte. [Präteritum]

I couldn 't see what she was doing. [past continuous]

No veía lo que hacía. [pretérito imperfecto]

Je ne voyais pas ce qu' elle faisait. [imparfait]

Ik kon niet zien wat zij deed. [o.v.t.]

Tense Tuple 5 : Nart 3

(5) **Narrative 3** (Top 5, 23 in frequency, dubbed **Nart 3** below):

German	English	Spanish	French	Dutch
perfekt	simple past	pretérito indefinido	passé composé	v.t.t.

This tuple occurs in narrative contexts in which the eventuality has been quantified (delimited) either by an adverbial or by a definite object or by a locative phrase:

No.25827: Ich habe den ganzen Nachmittag gearbeitet . [perfekt]

I worked all afternoon . [simple past]

Trabajé toda la tarde . [pretérito indefinido]

J' ai travaillé tout l' après-midi . [passé composé]

De hele middag heb ik gewerkt . [v.t.t.]

Two More Tuples

- Perfect: tense or aspect? Long-term debate
- Besides the most frequent 5 tuples, **the prototypical present-prefect and past-prefect tuples** are also investigated.

Tense Tuple 6: Pres. Perfect

(6) **Present Perfect** (Top 7, 10 in frequency, dubbed **Pres Perfect**):

German	English	Spanish	French	Dutch
perfekt	present perfect	pretérito perfecto compuesto	passé composé	v.t.t.

This is the prototypical present-perfect tuple used for contexts conveying current relevance:

No. 25186

Und tatsächlich ist ihm Madame Meursaults Tod sehr nahegegangen. [perfekt]

And the fact is that Mrs Meursault 's death has affected him very badly . [present perfect]

Y la verdad es que la muerte de la señora Meursault lo ha afectado mucho , pensó que no debía negarle la autorización . [pretérito perfecto compuesto]

Et le fait est que la mort de Mme Meursault l' a beaucoup affecté. [passé composé]

Tense Tuple 7: Pluperfect

(7) Tuple Pluperfect (Top 8, 9 in frequency)

German	English	Spanish	French	Dutch
plusquamperfekt	past perfect	pretérito pluscuamperfecto	plus-que-parfait	v.v.t.

This prototypical past-perfect tuple shows up in contexts expressing past-in-past reading or perfect-in-past reading, e.g.:

No. 32046

Dann ist mir eingefallen , daß er von Mama geredet hatte , bevor er mich zum Heimleiter brachte.[plusquamperfekt]

Then I remembered that before taking me to see the warden , he 'd talked to me about mother . [past perfect]

Recordé después que , antes de llevarme a ver al director , me había hablado de mamá .

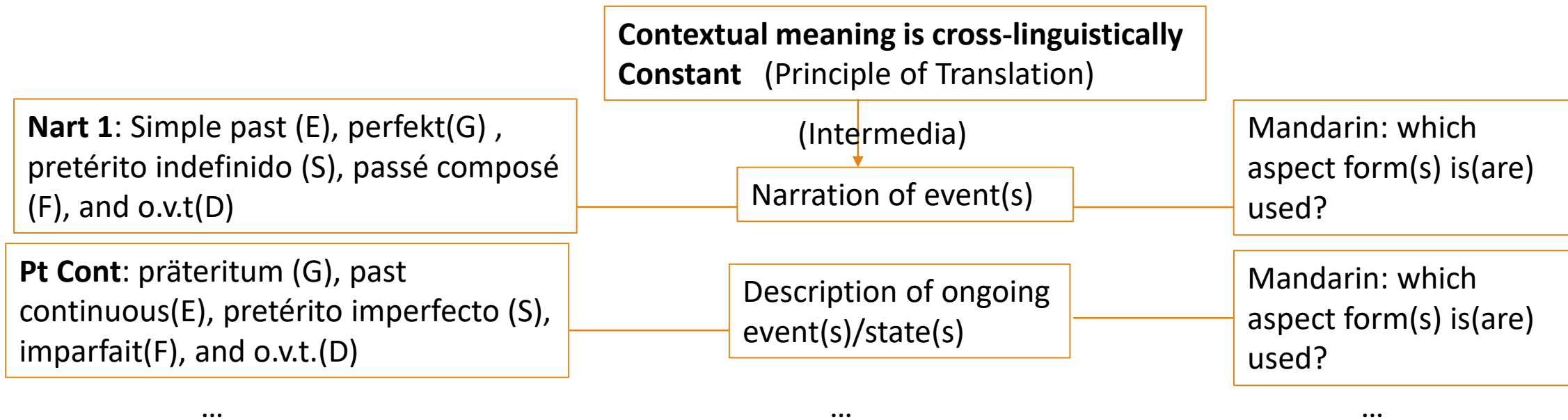
[pretérito pluscuamperfecto]

Puis je me suis souvenu qu' avant de me conduire chez le directeur , il m' avait parlé de maman .[plus-que-parfait]

Daarna herinnerde ik mij dat hij mij , alvorens mij naar de directeur te brengen , over moeder had gesproken . [v.v.t.]

From Tense Tuples to Aspect Forms

- 7 tense tuples: 7 cross-linguistic prototypical European temporal notions in the novel genre.
- Take the constant contextual meaning as intermedia, to explore whether & how the 7 tense tuples are semantically associated with Mandarin aspect forms.



Distribution of aspect forms over tense tuples

Aspect Form	Nart 1		Pt Impf		Present		Pt Cont		Nart 3		Pres Perfect		Pluperfect	
	Count	AE%	Count	AE%	Count	AE%	Count	AE%	Count	AE%	Count	AE%	Count	AE%
unmarked	125	51,44%	42	48,84%	19	73,08%	13	54,17%	10	47,62%	4	50,00%	3	33,33%
rvc	41	16,87%	4	4,65%	1	3,85%	1	4,17%	0	0,00%	0	0,00%	1	11,11%
le1	35	14,40%	4	4,65%	1	3,85%	0	0,00%	8	38,10%	1	12,50%	0	0,00%
le12	20	8,23%	8	9,30%	2	7,69%	1	4,17%	3	14,29%	2	25,00%	2	22,22%
non-verb	2	0,82%	21	24,42%	3	11,54%	1	4,17%	0	0,00%	0	0,00%	0	0,00%
zhe	8	3,29%	4	4,65%	0	0,00%	4	16,67%	0	0,00%	0	0,00%	0	0,00%
duplication	11	4,53%	1	1,16%	0	0,00%	0	0,00%	0	0,00%	0	0,00%	0	0,00%
zai	1	0,41%	1	1,16%	0	0,00%	4	16,67%	0	0,00%	0	0,00%	0	0,00%
guo	0	0,00%	1	1,16%	0	0,00%	0	0,00%	0	0,00%	1	12,50%	3	33,33%
Tense Tuple Sum	243	100,00%	86	100,00%	26	100,00%	24	100,00%	21	100,00%	8	100,00%	9	100,00%

Findings in Camus dataset (I)

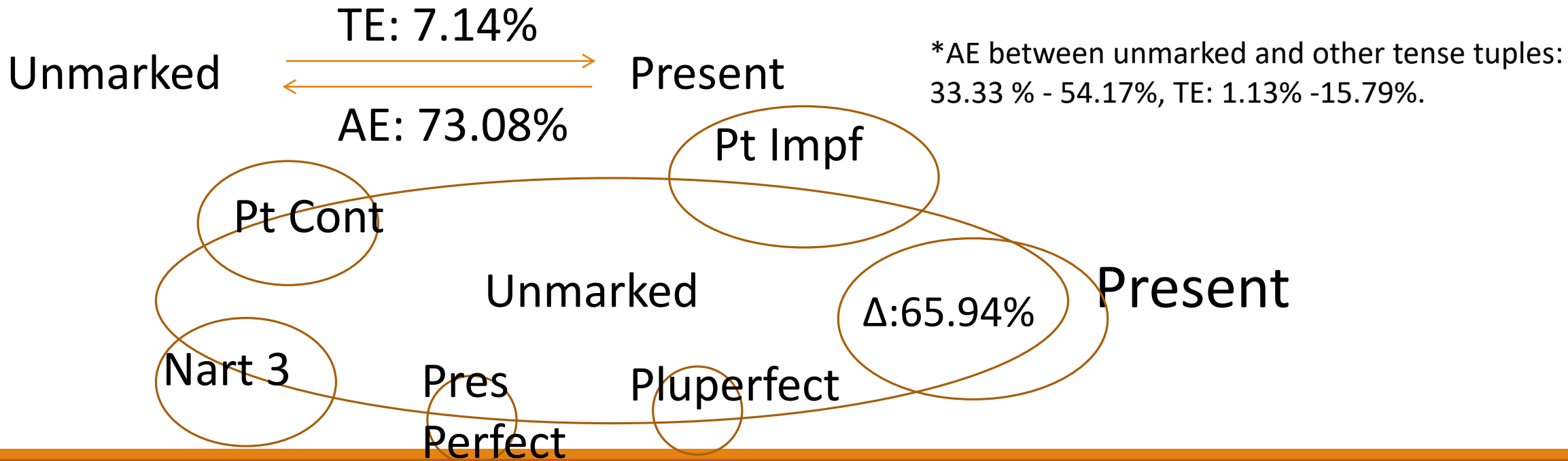
- No one-to-one correspondence between any tense tuple and aspect form
- 3 aspect forms show evident distribution tendency:
 - duplication: Nart 1
 - zai:Pt Cont
 - guo:Pres. Perfect & Pluperfect

Distribution of tense tuple over aspect form

Aspect Form	Nart 1		Pt Impf		Present		Pt Cont		Nart 3		Pres Perfect		Pluperfect		Others		Aspect Form Sum	
	Count	TE%	Count	TE%	Count	TE%	Count	TE%	Count	TE%	Count	TE%	Count	TE%	Count	TE%	Count	TE%
unmarked	125	46.99%	42	15.79%	19	7.14%	13	4.89%	10	3.76%	4	1.50%	3	1.13%	50	18.80%	266	100.00%
rvc	41	64.06%	4	6.25%	1	1.56%	1	1.56%	0	0.00%	0	0.00%	1	1.56%	16	25.00%	64	100.00%
le1	35	58.33%	4	6.67%	1	1.67%	0	0.00%	8	13.33%	1	1.67%	0	0.00%	11	18.33%	60	100.00%
le12	20	44.44%	8	17.78%	2	4.44%	1	2.22%	3	6.67%	2	4.44%	2	4.44%	7	15.56%	45	100.00%
duplication	11	91.67%	1	8.33%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	12	100.00%
zhe	8	42.11%	4	21.05%	0	0.00%	4	21.05%	0	0.00%	0	0.00%	0	0.00%	3	15.79%	19	100.00%
non-verb	2	6.25%	21	65.63%	3	9.38%	1	3.13%	0	0.00%	0	0.00%	0	0.00%	5	15.63%	32	100.00%
zai	1	16.67%	1	16.67%	0	0.00%	4	66.67%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	6	100.00%
guo	0	0.00%	1	20.00%	0	0.00%	0	0.00%	0	0.00%	1	20.00%	3	60.00%	0	0.00%	5	100.00%

Findings in Camus dataset (II): Unmarked

- The unmarked context is semantically unspecified. A great semantic intersection between unmarked context and Present context (73.08% vs 7.14%, Δ :65.94%).
- Pt Cont, Nart 3, Pres Perfect, Pt Impf, Pluperfect moderately overlaps with unmarked.



Inferential Statistics: Association Test of Unmarked

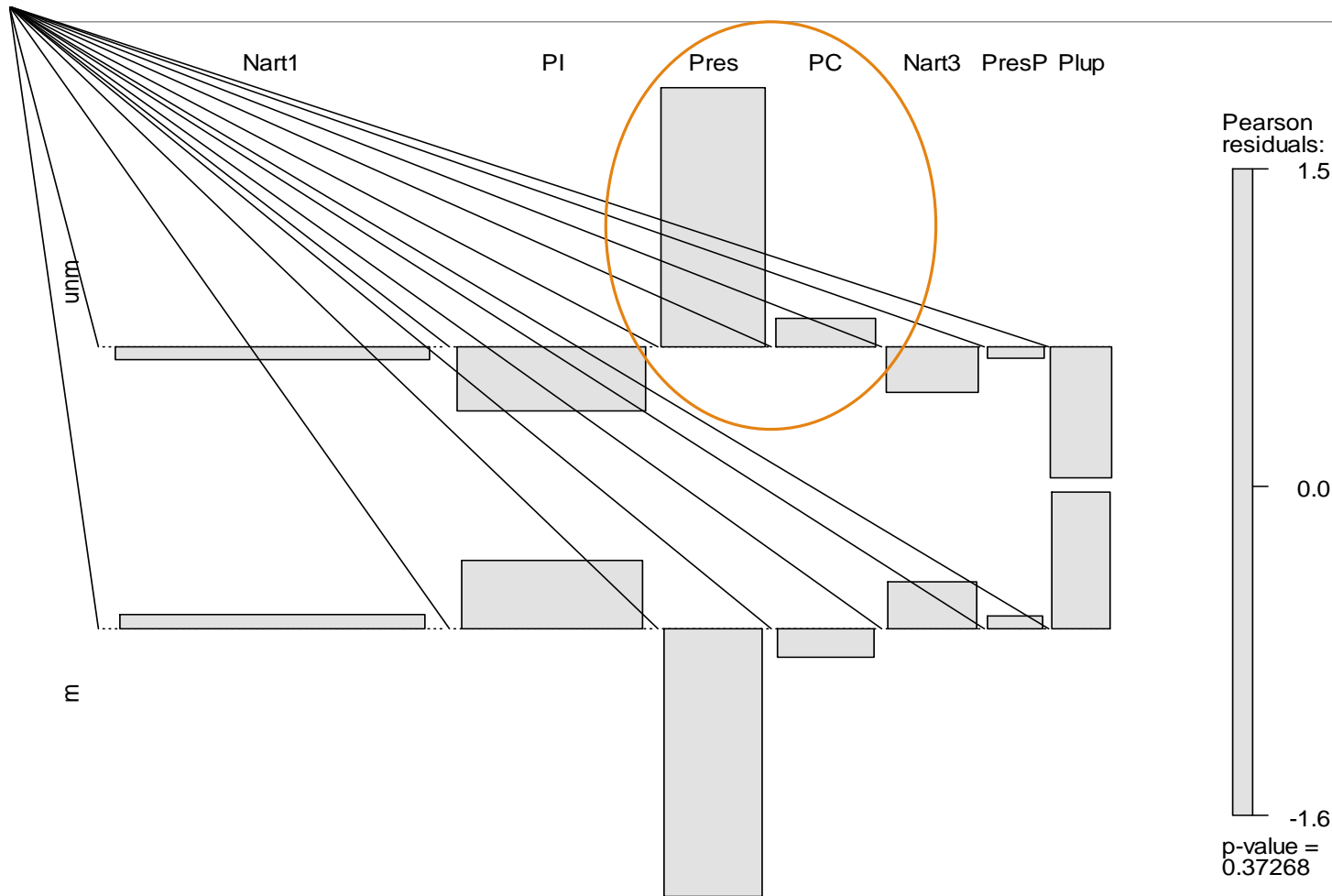
Q: Does the unmarked form randomly co-occur with the 7 tense tuples in the Camus dataset?

H0: the unmarked form randomly co-occurs with the 7 tense tuples in the Camus dataset.

	Nart 1	Pt. Impf	Present	Pt. Cont	Nart 3	Pres. Perfect	Pluperfect
Unmarked	125	42	19	13	10	4	3
Marked	118	44	7	11	11	4	6

Fisher test: $p = 0.365$, not significant, H0 not rejected, small effect size (Cramér's $V=0.125$)

Association Plot of Unmarked Form

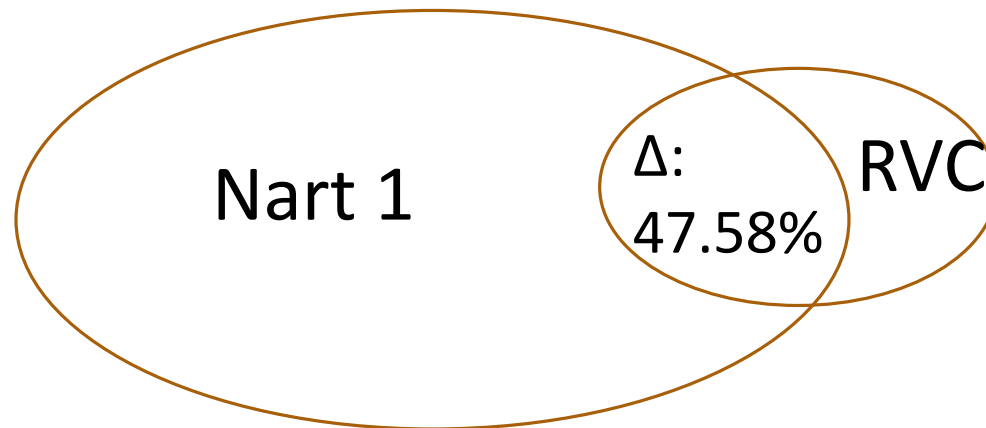


Pearson residual (+):
unmarked-Present (1.508)
unmarked-Pt Cont(0.161)

The Pearson residual is “the difference between the observed and expected frequencies divided by the squared root of the expected frequency” (Levshina 2015: 218).

Findings in Camus dataset (II): RVC

- A great semantic intersection between RVC context and Nart 1 context.



Inferential Statistics: Association test of RVC

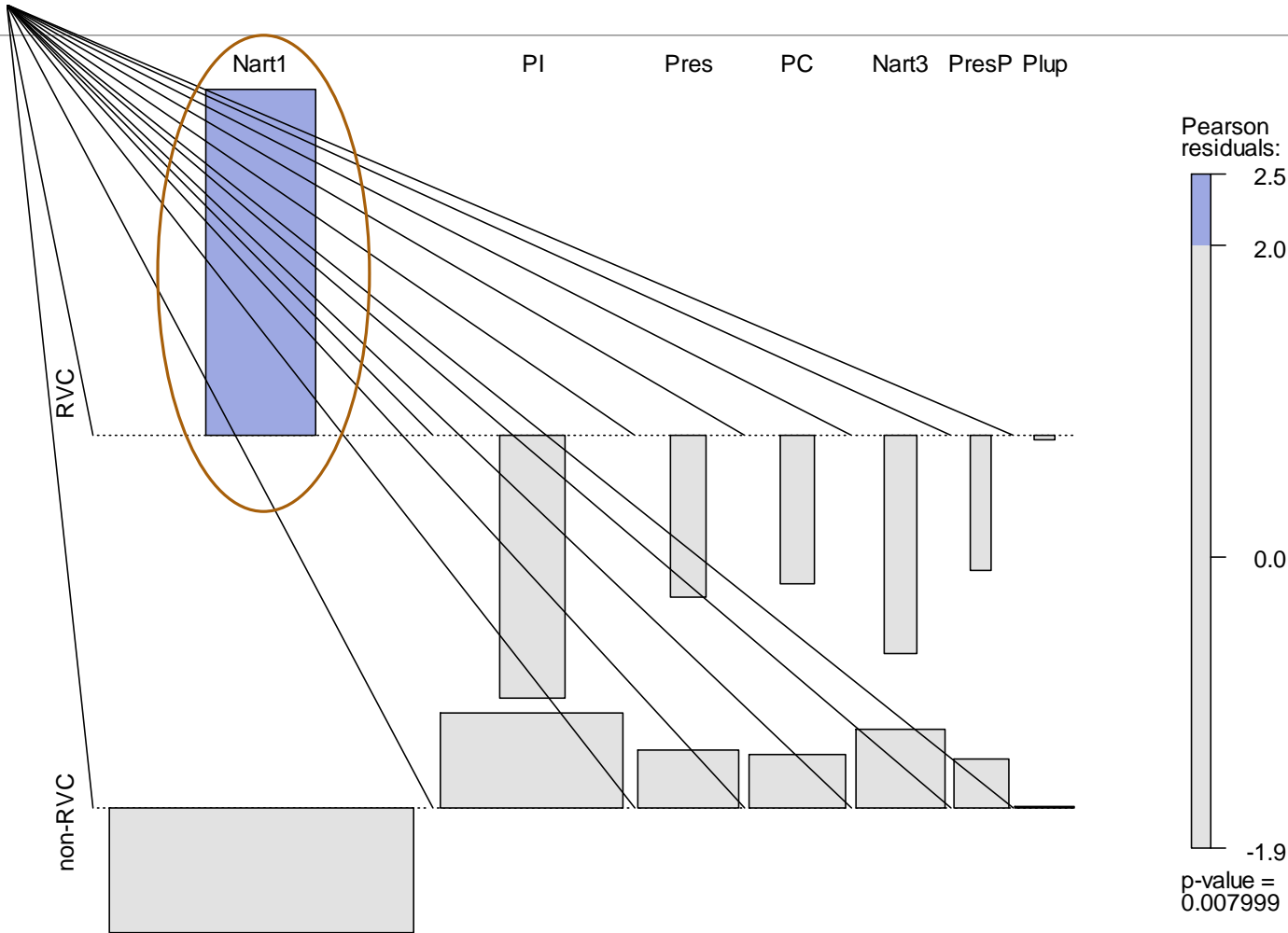
Question: Does the RVC form randomly co-occur with the 7 tense tuples in the Camus dataset?

H0: the RVC form randomly co-occurs with the 7 tense tuples in the Camus dataset.

	Nart 1	Pt. Impf	Present	Pt. Cont	Nart 3	Pres. Perfect	Pluperfect
RVC	41	4	1	1	0	0	1
Non-RVC	202	82	25	23	21	8	8

Fisher exact test: $p < .01$, significant, H0 rejected, small effect size (Cramér's $V=0.204$)

Association Plot of RVC

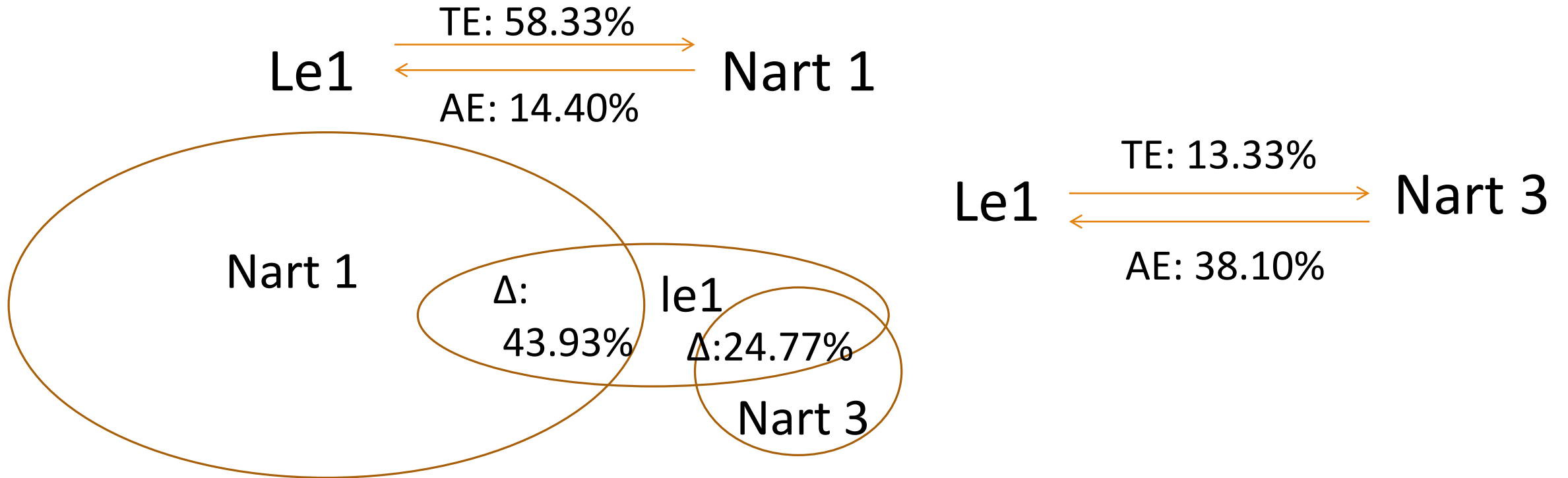


Pearson residual(+):

RVC-Nart 1 (2.463)

Findings in Camus Dataset (II): *Le1*

- A considerable intersection between *le1* context and Nart 1 and Nart 2 contexts respectively.



Inferential Statistics: Association Test of *le1*

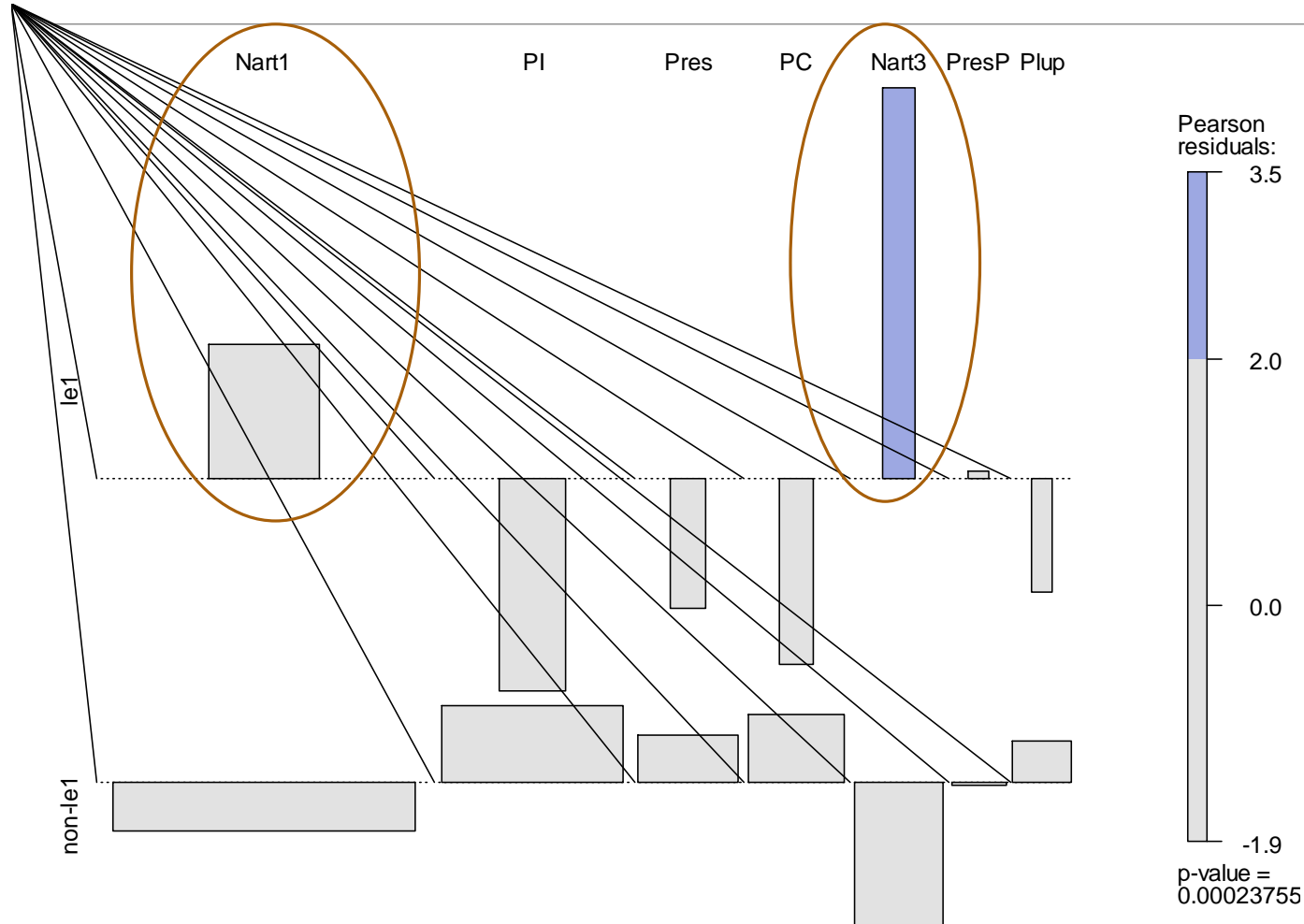
Q: Does the *le1* form randomly co-occur with the 7 tense tuples in the Camus dataset?

H0: the *le1* form randomly co-occurs with the 7 tense tuples in the Camus dataset.

	Nart 1	Pt. Impf	Present	Pt. Cont	Nart 3	Pres. Perfect	Pluperfect
<i>le1</i>	35	4	1	0	8	1	0
non- <i>le1</i>	208	82	25	24	13	7	9

Fisher exact test: $p < .01$, significant, H0 rejected, small effect size (Cramér's $V=0.249$)

Association Plot of *le1*



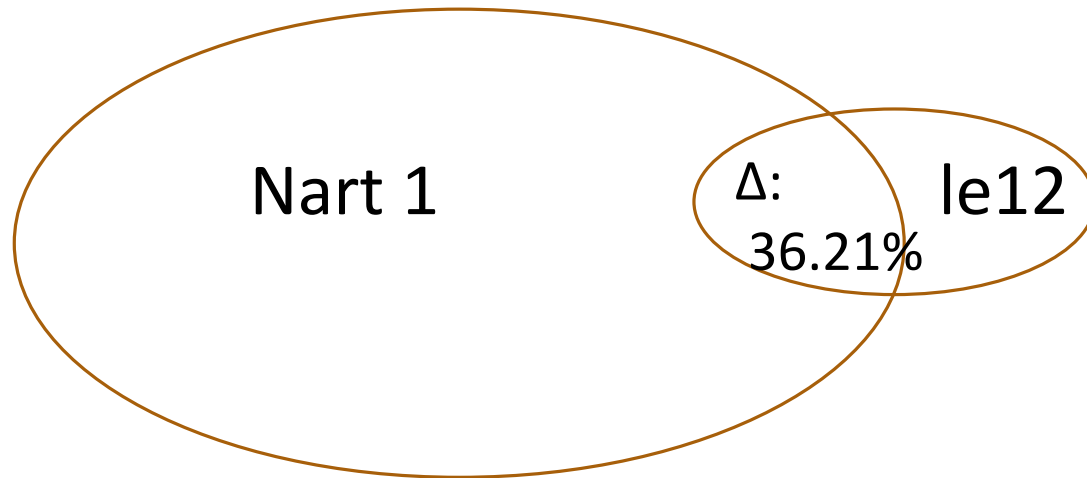
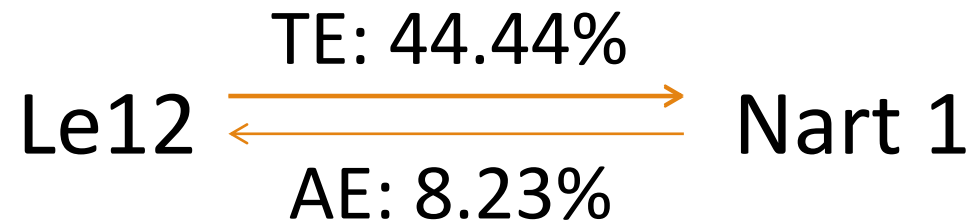
Pearson residual(+):

Le1-Nart 3 (3.522)

Le1-Nart 1 (1.206)

Findings in Camus dataset (II): *Le12*

- A moderate semantic intersection between *le12* context and Nart1 context.



Inferential Statistics: Association Test of *Le12*

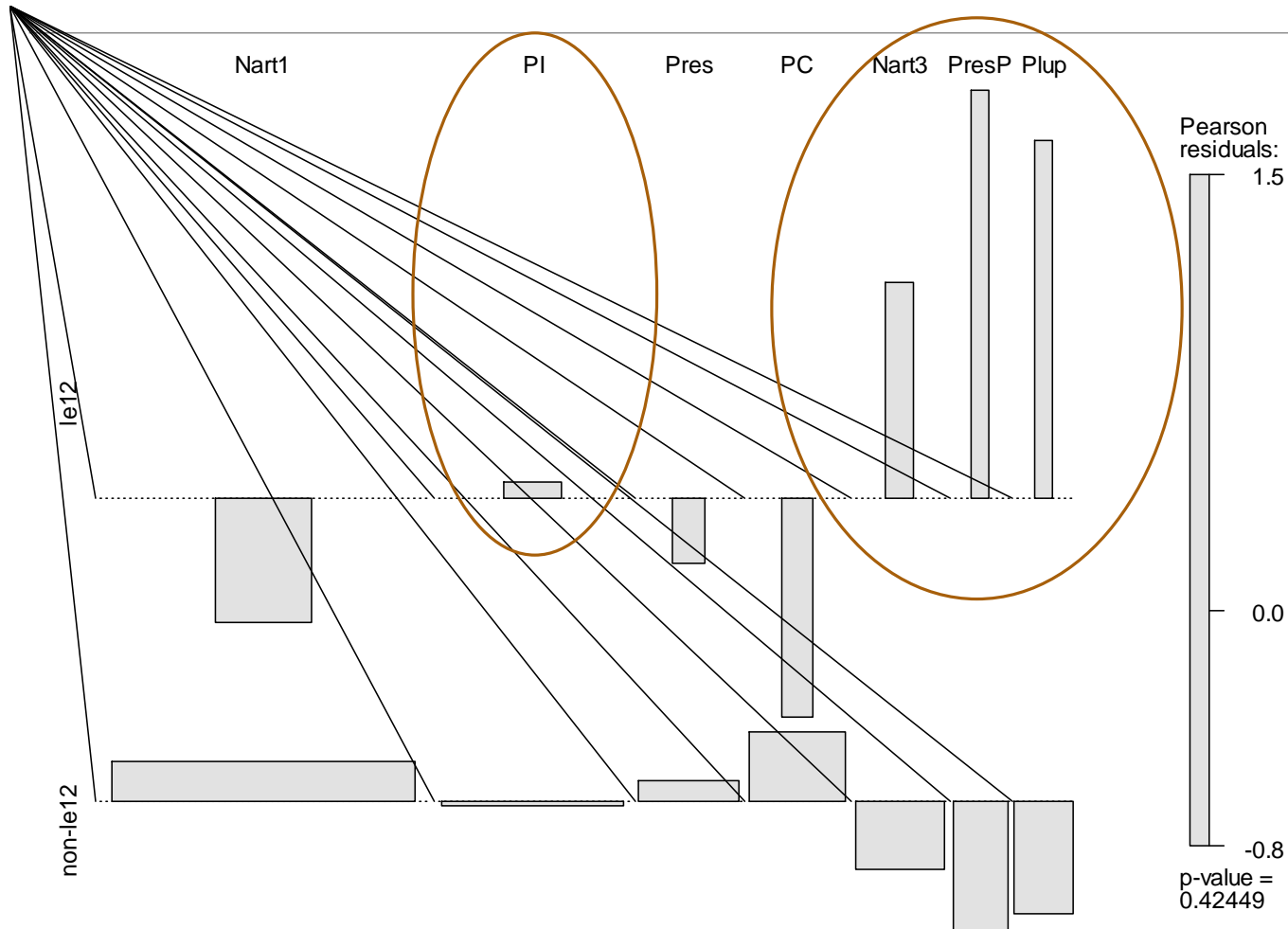
Q: Does the *le12* form randomly co-occur with the 7 tense tuples in the Camus dataset?

H0: the *le12* form randomly co-occurs with the 7 tense tuples in the Camus dataset.

	Nart 1	Pt. Impf	Present	Pt. Cont	Nart 3	Pres. Perfect	Pluperfect
<i>le12</i>	20	8	2	1	3	2	2
non- <i>le12</i>	223	78	24	23	18	6	7

Fisher exact test: $p = 0.306$, not significant, H0 not rejected, small effect size (Cramér's $V = 0.120$)

Association Plot of *le12*



Pearson residual(+):

Le12-Pres. perfect (1.489)

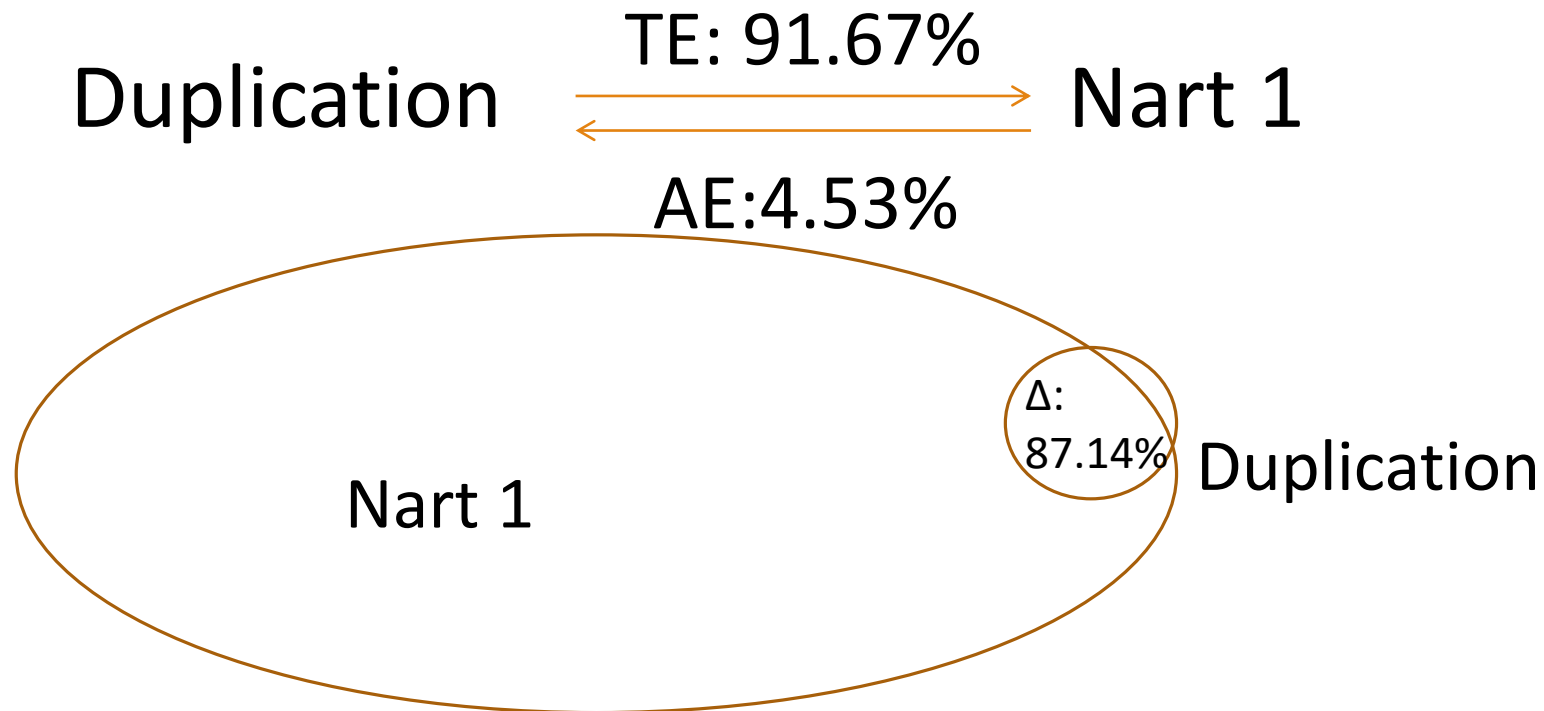
Le12-Pluperfect (1.303)

Le12-Nart 3 (0.785)

Le12-Pt Impf (0.058)

Findings in Camus dataset (II): Duplication

- A big semantic intersection between duplication context and Nart 1 context.



Inferential Statistics: Association Test of Duplication

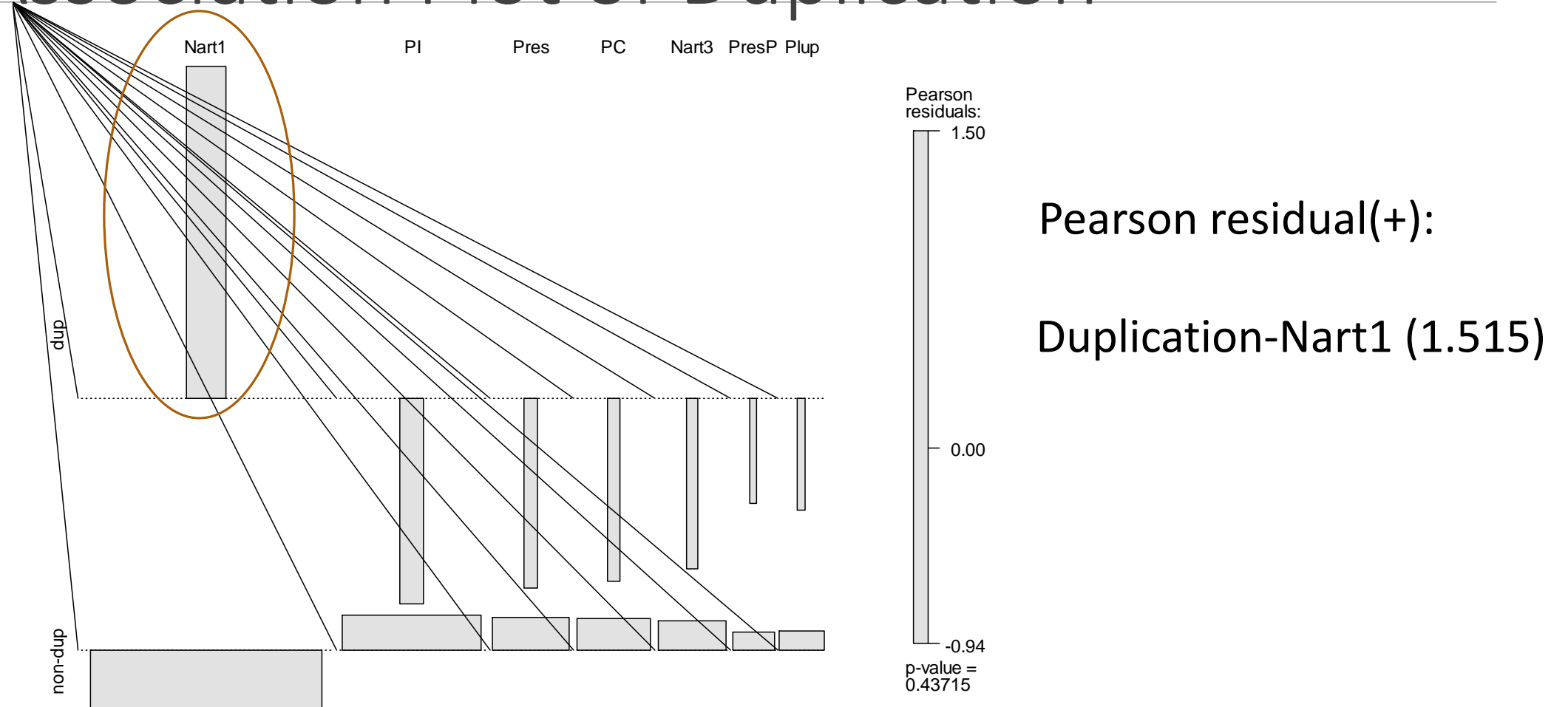
Q: Does the duplication form randomly co-occur with the 7 tense tuples in the Camus dataset?

H0: the duplication form randomly co-occurs with the 7 tense tuples in the Camus dataset.

	Nart 1	Pt. Impf	Present	Pt. Cont	Nart 3	Pres. Perfect	Pluperfect
duplication	11	1	0	0	0	0	0
Non-duplication	232	85	26	24	21	8	9

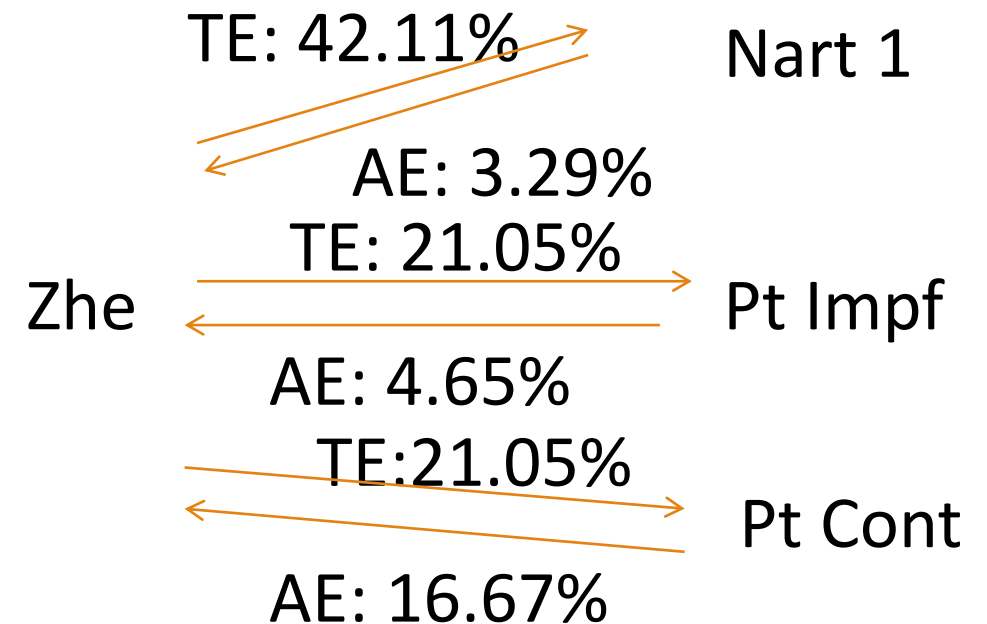
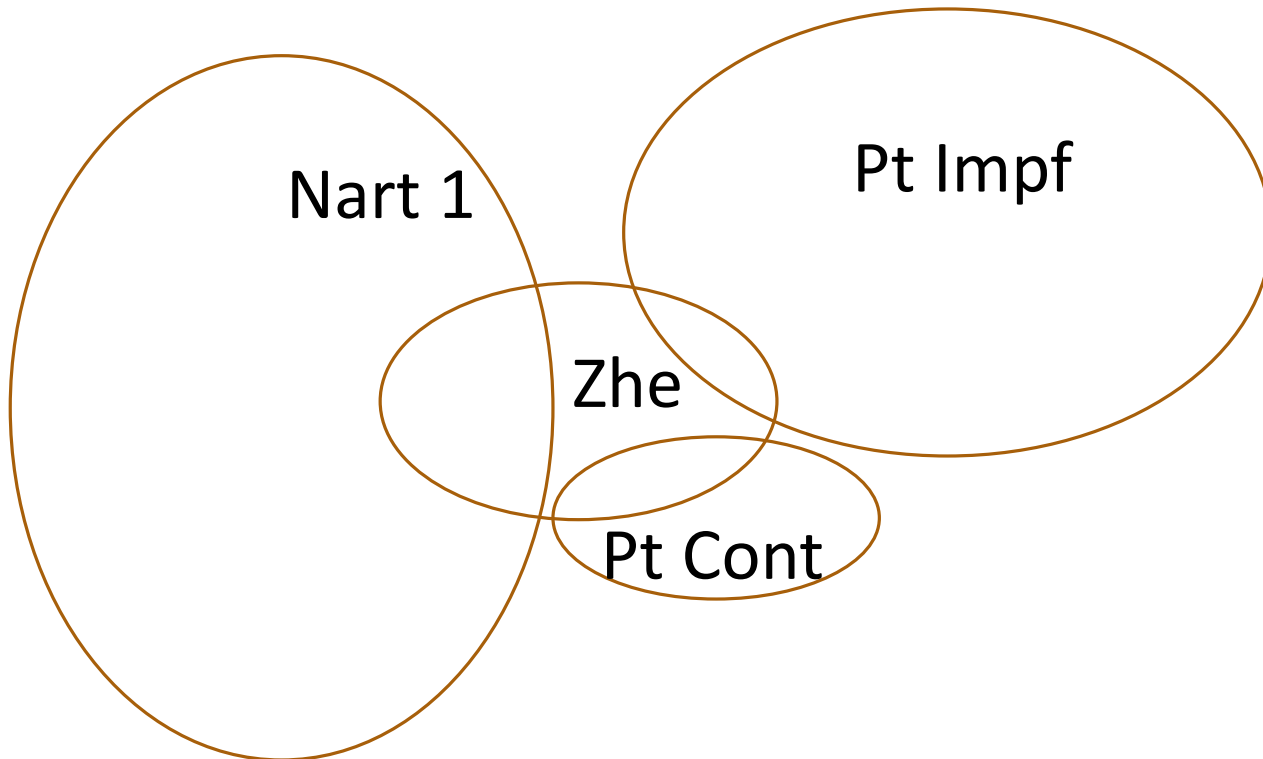
Fisher test: $p = 0.702$, not significant, H0 not rejected, small effect size (Cramér's $V=0.119$)

Association Plot of Duplication



Findings in Camus dataset (II): *Zhe*

- A moderate semantic intersection between *zhe* context and Nart1, Pt Impf and Pt Cont contexts.



Inferential Statistics: Association Test of *Zhe*

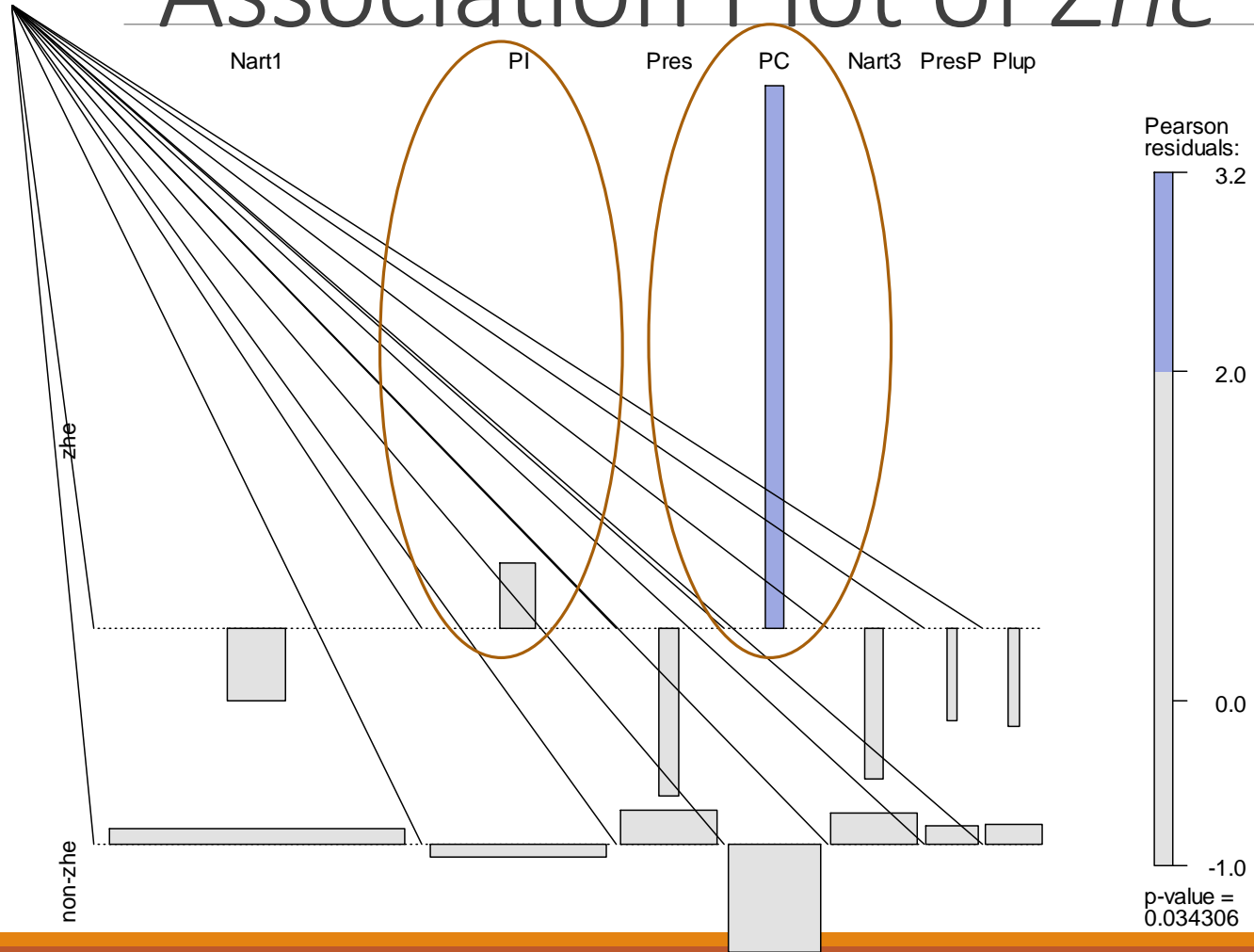
Q: Does the *zhe* form randomly co-occur with the 7 tense tuples in the Camus dataset?

H0: the *zhe* form randomly co-occurs with the 7 tense tuples in the Camus dataset.

	Nart 1	Pt. Impf	Present	Pt. Cont	Nart 3	Pres. Perfect	Pluperfect
<i>zhe</i>	8	4	0	4	0	0	0
non- <i>zhe</i>	235	82	26	20	21	8	9

Fisher test: $p = 0.143$, not significant, H0 not rejected, small effect size (Cramér's $V=0.181$)

Association Plot of Zhe



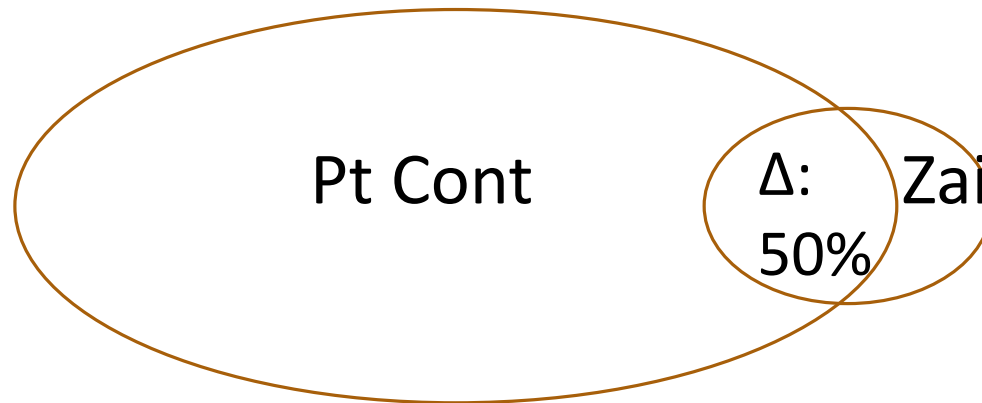
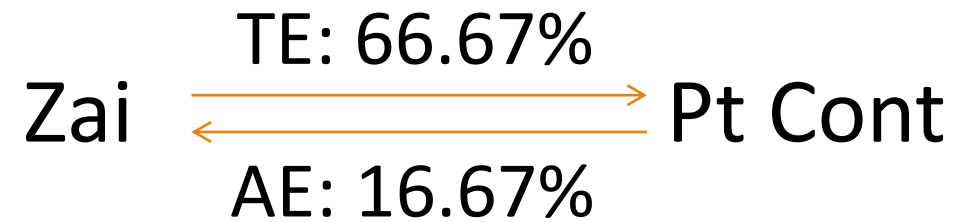
Pearson residual(+):

Zhe-Pt Cont(3.209)

Zhe-Pt Impf (0.385)

Findings in Camus Dataset (II): *Zai*

- A big semantic intersection between *zai* context and Pt Cont context.



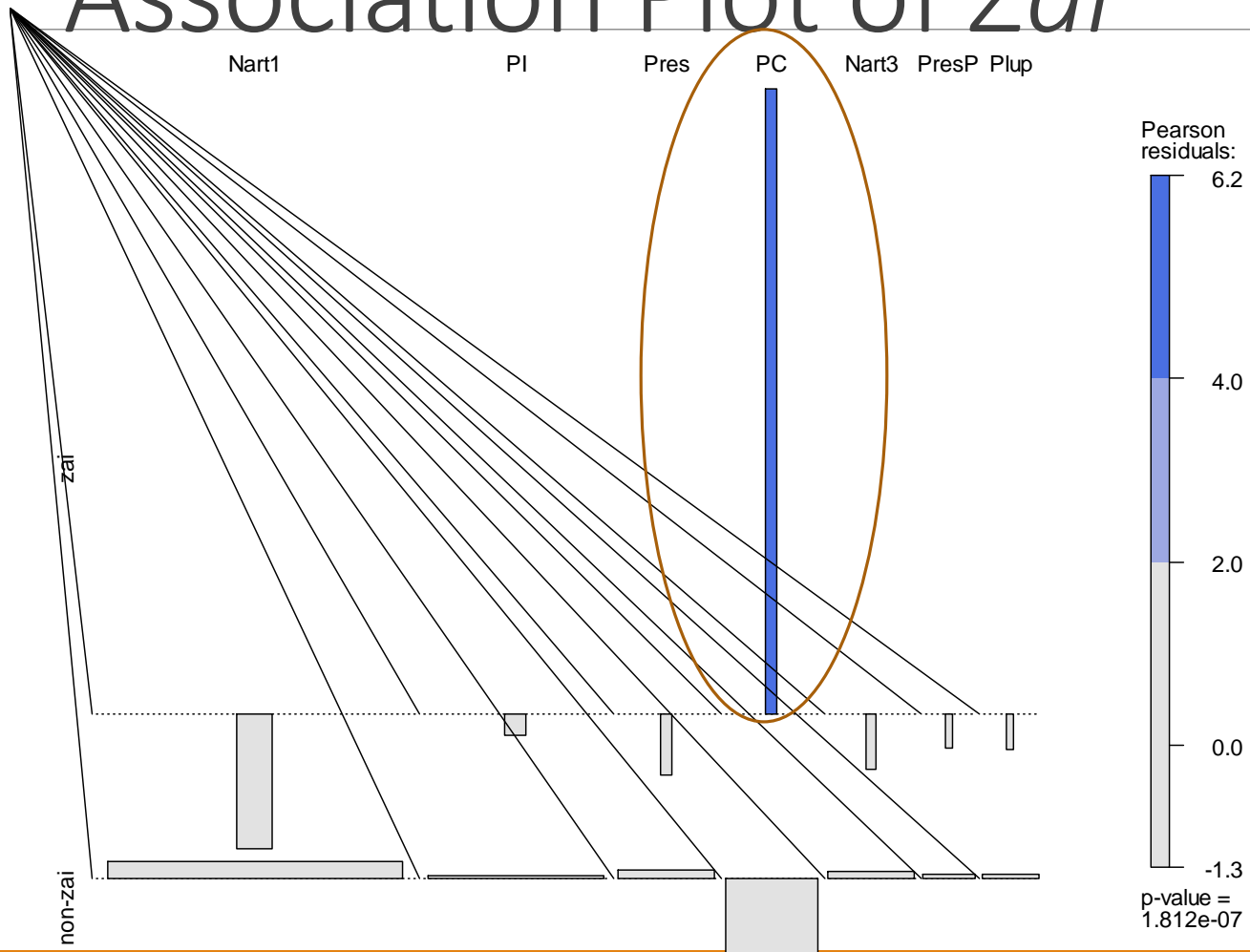
Inferential Statistics: Association Test of *Zai*

Q: Does the *zai* form randomly co-occur with the 7 tense tuples in the Camus dataset?
H0: the *zai* form randomly co-occurs with the 7 tense tuples in the Camus dataset.

	Nart 1	Pt. Impf	Present	Pt. Cont	Nart 3	Pres. Perfect	Pluperfect
<i>zai</i>	1	1	0	4	0	0	0
non- <i>zai</i>	242	85	26	20	21	8	9

Fisher test: $p < .01$, not significant, H0 not rejected, moderate effect size (Cramér's $V=0.317$)

Association Plot of *Zai*

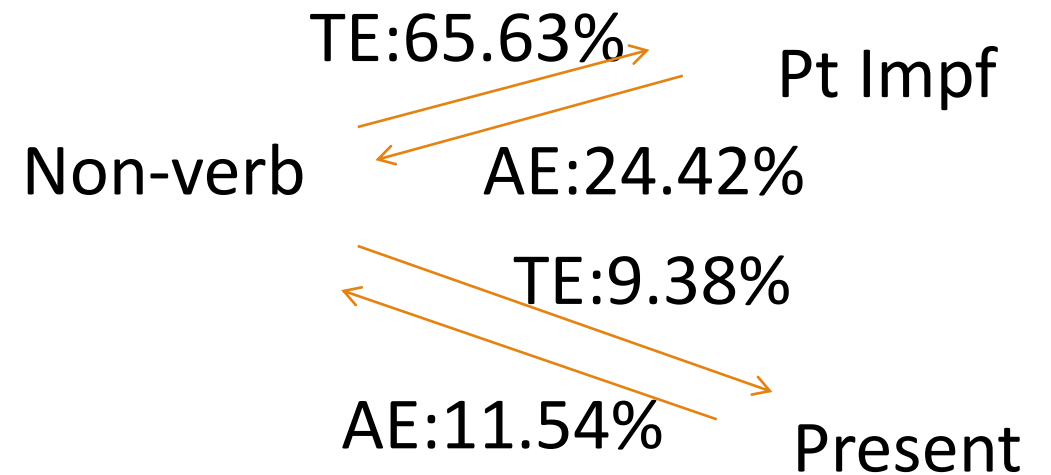
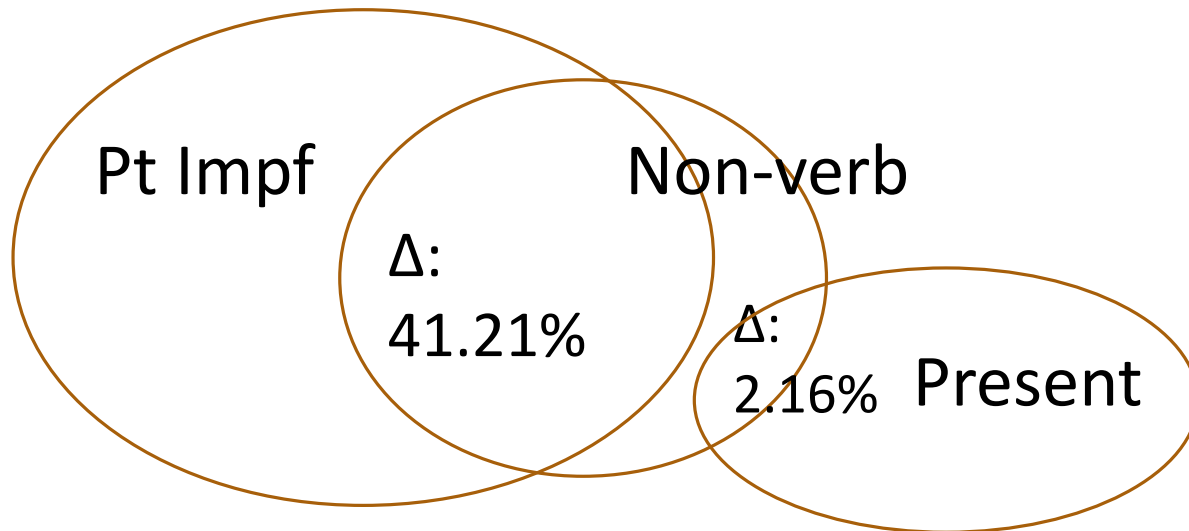


Pearson residual(+):

Zhe-Pt Cont(6.219)

Findings in Camus dataset (II): Non-verb

- A big semantic intersection between non-verb context and Pt Impf context.
- A small but not ignorable semantic intersection between non-verb context and Present context.



Inferential Statistics: Association test of non-verb

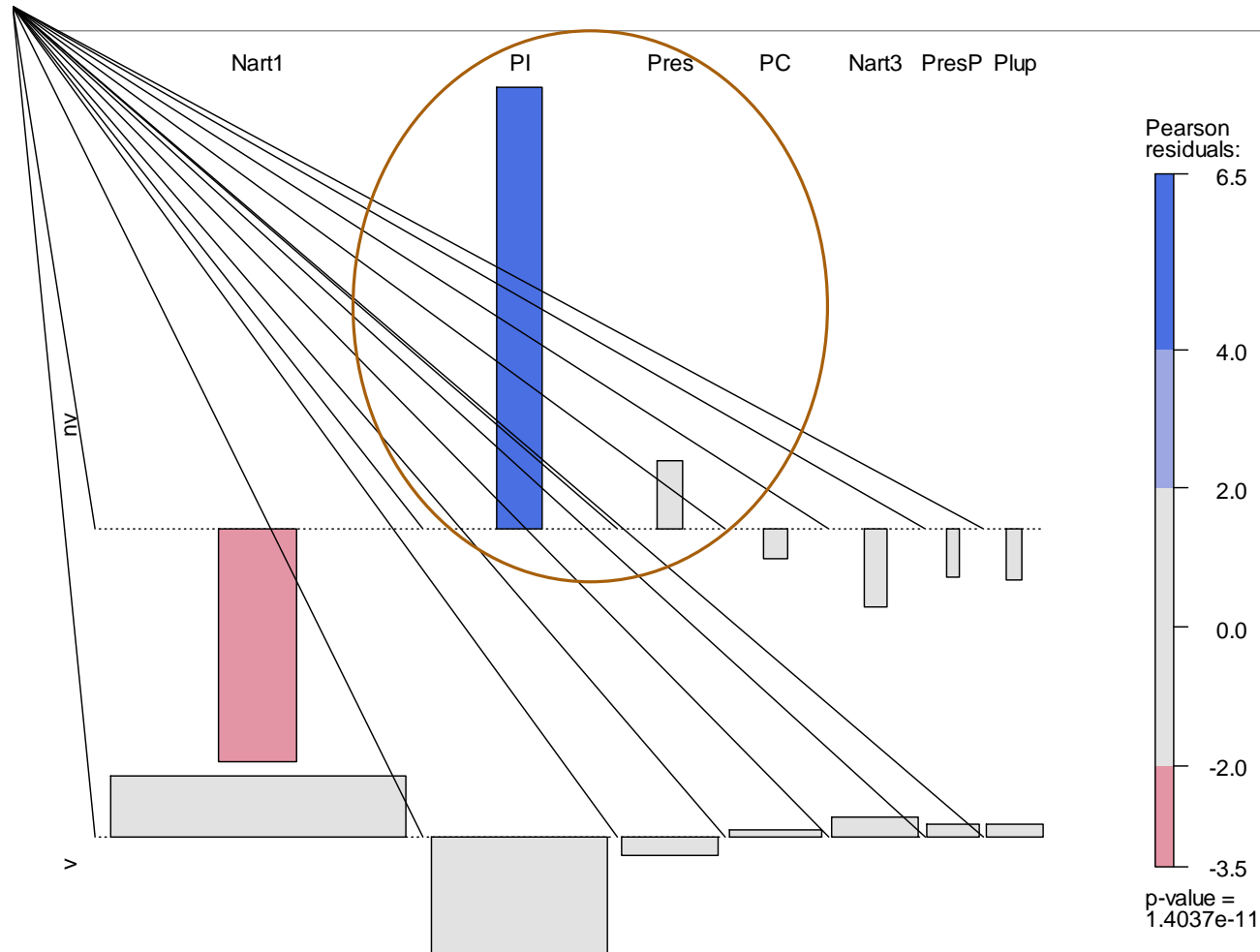
Q: Does the non-verb form randomly co-occur with the 7 tense tuples in the Camus dataset?

H0: the non-verb form randomly co-occurs with the 7 tense tuples in the Camus dataset.

	Nart 1	Pt. Impf	Present	Pt. Cont	Nart 3	Pres. Perfect	Pluperfect
non-verb	2	21	3	1	0	0	0
verbal	241	65	23	23	21	8	9

Chi-square test: $\chi^2(6) = 62.488$, $p < .01$, significant, H0 rejected, moderate effect size (Cramér's $V=0.387$)

Association Plot of Non-verb



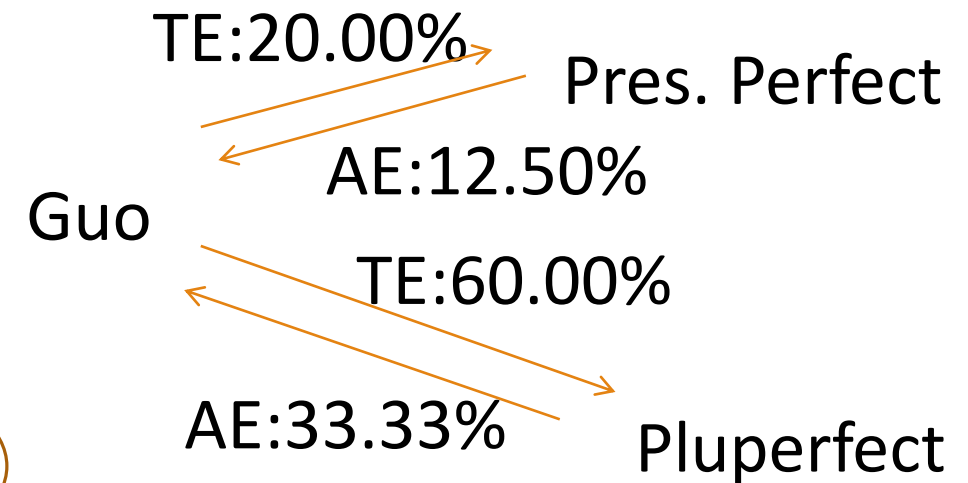
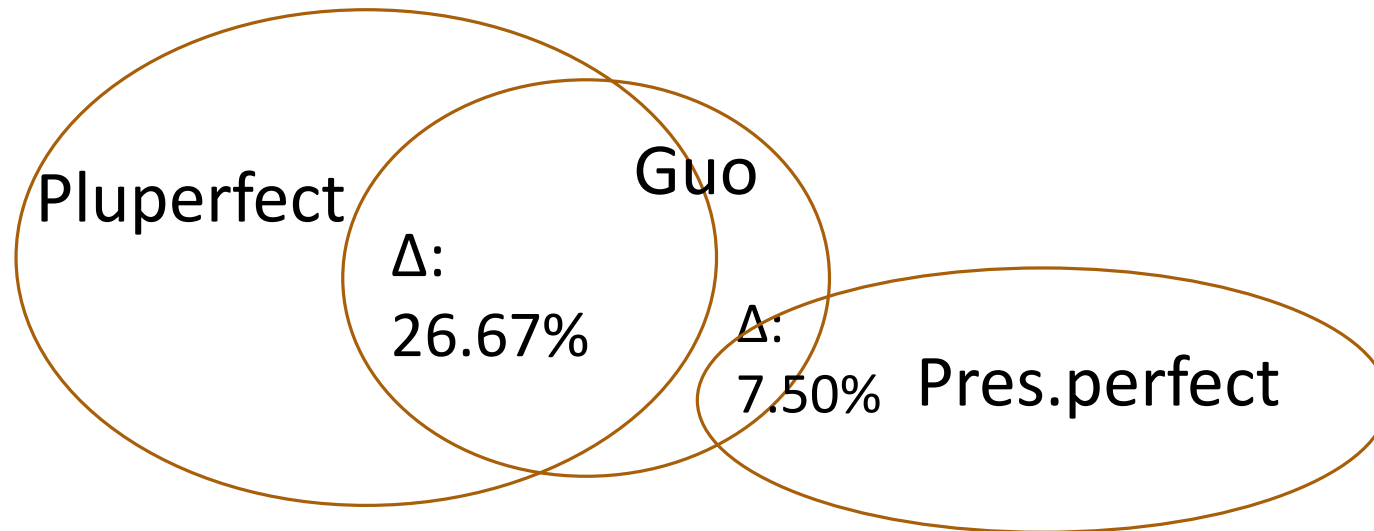
Pearson residual (+):

non-verb - Pt Impf(6.540)

non-verb - Present (1.015)

Findings in Camus Dataset (II): *Guo*

- A big semantic intersection between *guo* and Pluperfect context.
- A considerable semantic intersection between *guo* context and Pres. perfect context.



Inferential Statistics: Association Test of *Guo*

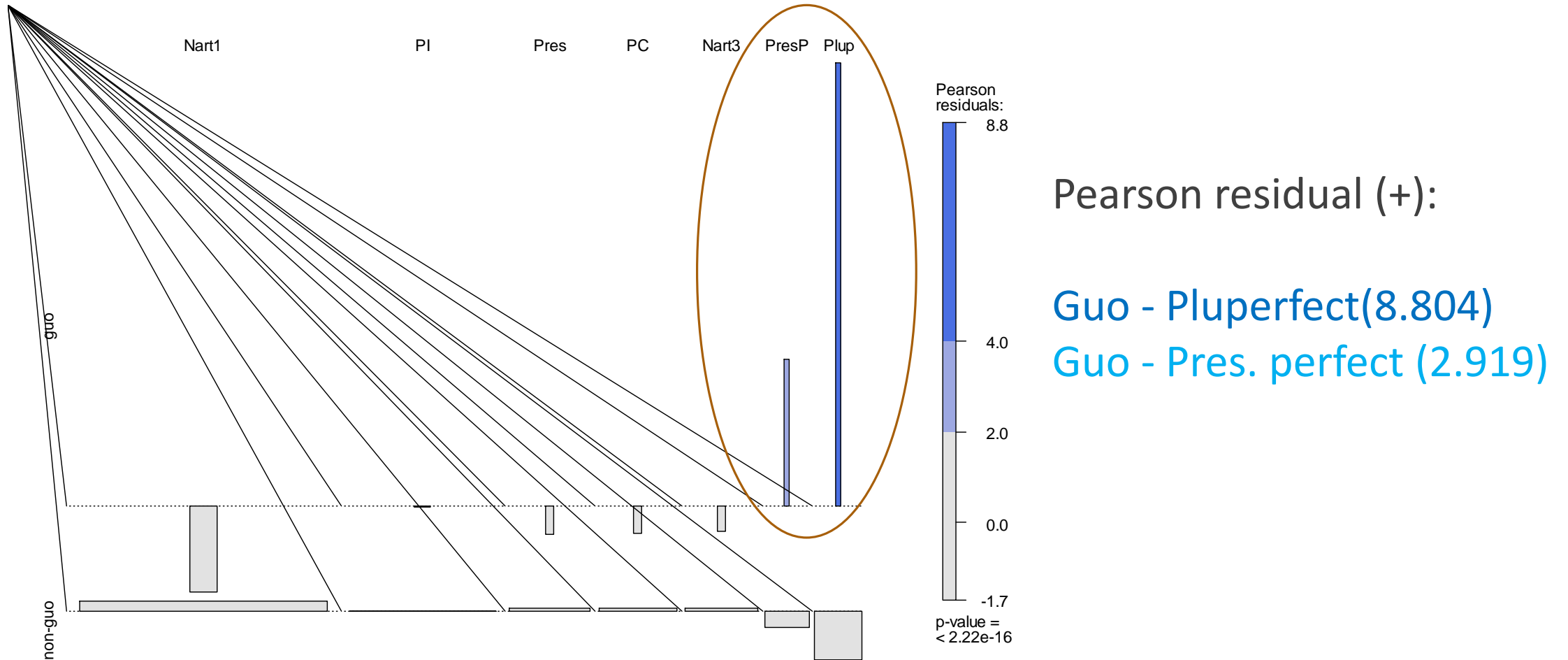
Q: Does the *guo* form randomly co-occur with the 7 tense tuples in the Camus dataset?

H0: the *guo* form randomly co-occurs with the 7 tense tuples in the Camus dataset.

	Nart 1	Pt. Impf	Present	Pt. Cont	Nart 3	Pres. Perfect	Pluperfect
guo	0	1	0	0	0	1	3
non-guo	243	85	26	24	21	7	6

Fisher test: $p < .01$, significant, H0 rejected, moderate effect size (Cramér's $V=0.467$)

Association Plot of *Guo*



Statistical Summary: Aspect-oriented

Aspect form	Unmarked	RVC	Le1	Le12	Duplication	Zhe	Zai
Significant (Fisher/Chi-square test)	×(p=0.365)	√ (p<.01)	√ (p<.01)	×(p=0.306)	× (p=0.702)	×(p=0.143)	√ (p<.01)
Effect size (Cramér's V)	Small (0.125)	Small (0.204)	Small (0.249)	Small (0.120)	Small (0.119)	Small (0.181)	Moderate(0.317)
Top co-occurrence Tense Tuple(s)	Present> Pt Cont	Nart 1	Nart 3>Nart 1>Pres. perfect	Pres. perfect>Plu perfect> Nart 3>Pt Impf	Nart 1	Pt Cont>Pt Impf	Pt Cont

Statistical Summary:Aspect-oriented (Continued)

Aspect form	Guo	Non-verb
Significant (Fisher/Chi-square test)	v (p<.01)	v (p<.01) $\chi^2(6) = 62.488$
Effect size (Cramér's V)	Moderate(0.467)	Moderate(0.387)
Top co-occurrence Tense Tuple(s)	Pluperfect>Pres.perfect	Pt Impf>Present

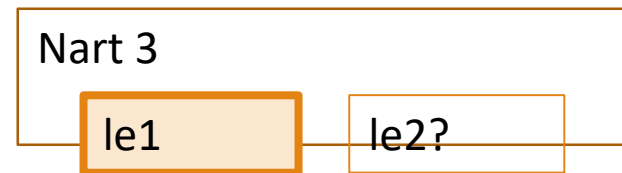
Statistical Summary: Tense-oriented

Tense Tuple	Nart 1	Pt Impf	Present	Nart 3	Pt Cont	Pres. Perfect	Pluperfect
Significant (Fisher/Chi-square test)	√ (p<.01)	√ (p<.01)	×(p=0.474)	√ (p=0.041)	√ (p<.01)	×(p=0.190)	√ (p<.01)
Effect size (Cramér's V)	Moderate (0.308)	Moderate (0.357)	Small (0.132)	Small (0.196)	Moderate(0.367)	Small (0.175)	Moderate(0.449)
Top co-occurrence Aspect form(s)	Dup > rvc> le1	Non-verb	Unmarked >non-verb	le1>le12	zai>zhe (>unmarked)	guo>le12 (>le1)	guo>le12

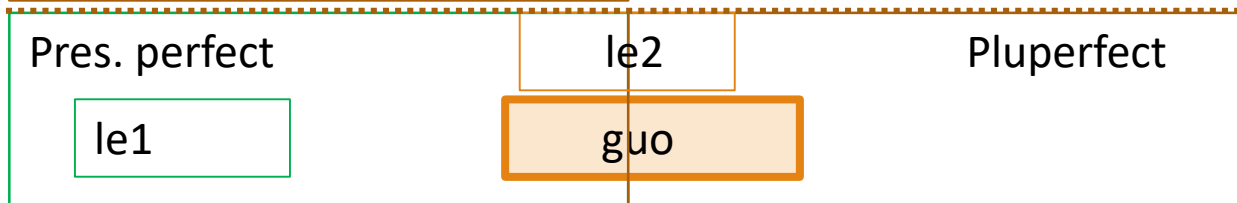
Conclusions

cross-linguistical (psychological) narrative entities: quasi-one-to-one correspondence?

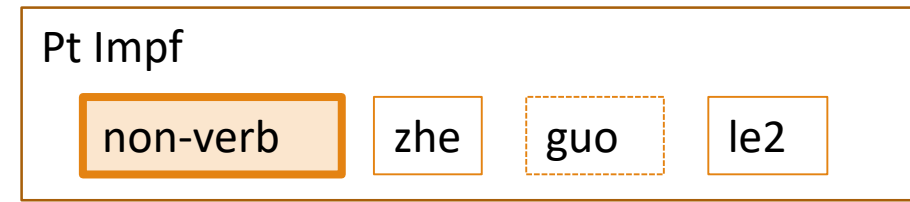
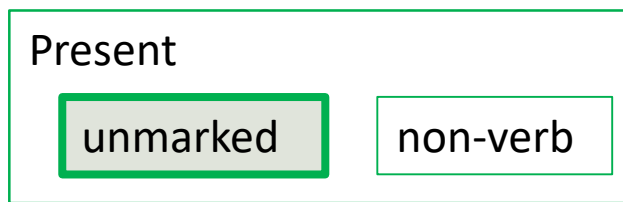
Coarse-scale[RT/ET>1]-----> Fine scale[RT/ET<1]



Perfective with and without QP (Kamp vs. Partee adv problem?)



Imperfective
perfect[retrospect]



Progressive (slow motion vs near-culmination [anticipate])

Conclusions

-No one-to-one correspondence relations, but 6 Mandarin aspect forms have strong semantic overlap with 7 tense tuples ('quasi-correspondence'):

Unmarked-Present

Guo-Pres. Perfect & Pluperfect

Non-verb- Pt Impf

Le1-Nart 3

Zai-Pt Cont

Duplication-Nart 1 (le1 intervention)

- 3 Mandarin aspect forms play 'secondary role' in those tense tuples:

RVC- Nart 1

Zhe- Pt Cont

Le2: Pres. Perfect & Pluperfect, Pt Impf, Nart 3(?)

Conclusions

- **Mandarin tends to mark PAST but not PRESENT:** All PAST tense tuples are not randomly associated with Mandarin aspect forms while the PRESENT tense tuples are.
- **Distinguish Perfective Mandarin aspect forms**
 1. *guo* : subset of Pres. Perfect and Pluperfect
 - interchangable with *le1* in Pres. Perfect, with *le2* in Pluperfect
 2. *le1*: perfective (bounded, quantified) & Pres.Perfect
 3. *le2*: pluperfect
 4. Dup: Nart 1 but with *le1* intervention
 5. RVC: Nart 1 but only 'secondary role'; often stacking with *le1* in finite clauses.

Conclusions

- **Distinguish Imperfective Mandarin aspect forms**

6. *Zai*: subset of Pt Cont (true progressive marker?)

7. *Zhe*: subset of Pt Cont & Pt Impf (but only 'secondary role' in both)

- Others

8. Unmarked: aspectually unspecified but its core semantics overlaps with Present tuple.

9. Non-verb: subset of Pt Impf and Present.

Reflections on the research

-Have clarified the scope of each tense tuple and Mandarin aspect form, as well as their interactions and differences.

Future Work:

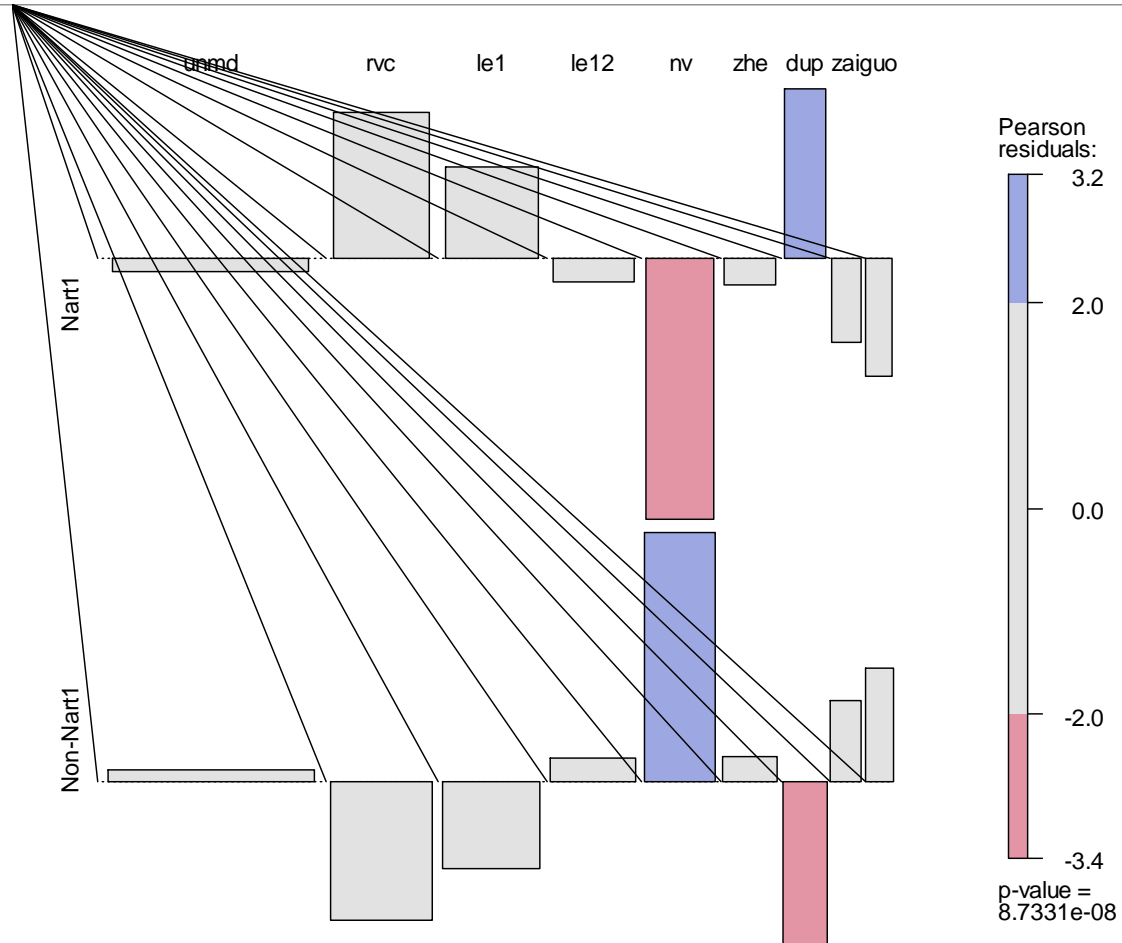
-Go back to texts and try to find out the factors (at lexical/syntactical/discourse levels) that determine the interactions and differences between tense tuples and aspect forms.

-Answer “How the temporal order has been established in discourse via the tense tuples/aspect forms as well as other entities (adv, coherent devices, etc) in discourse?”

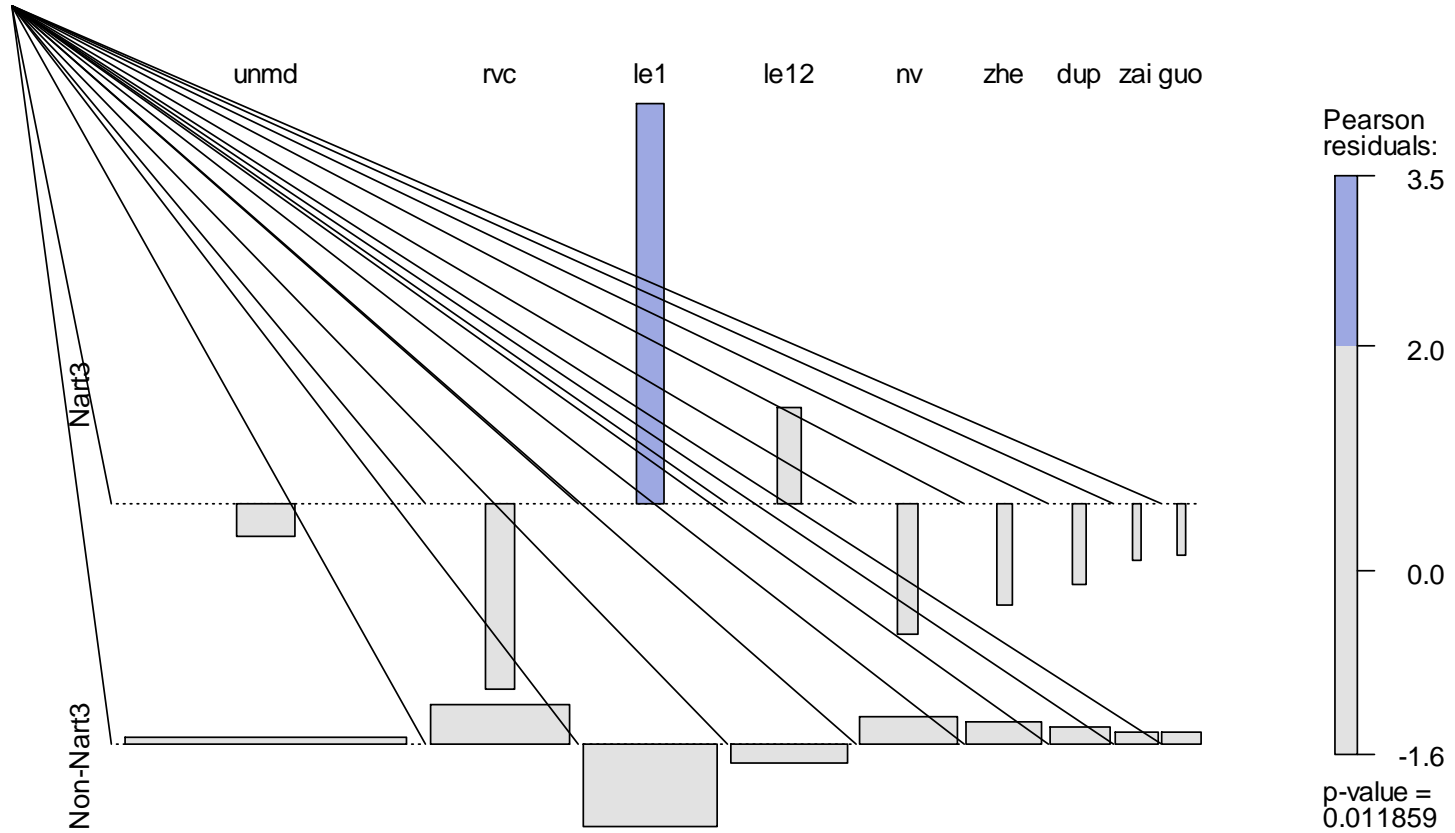
THANK YOU!



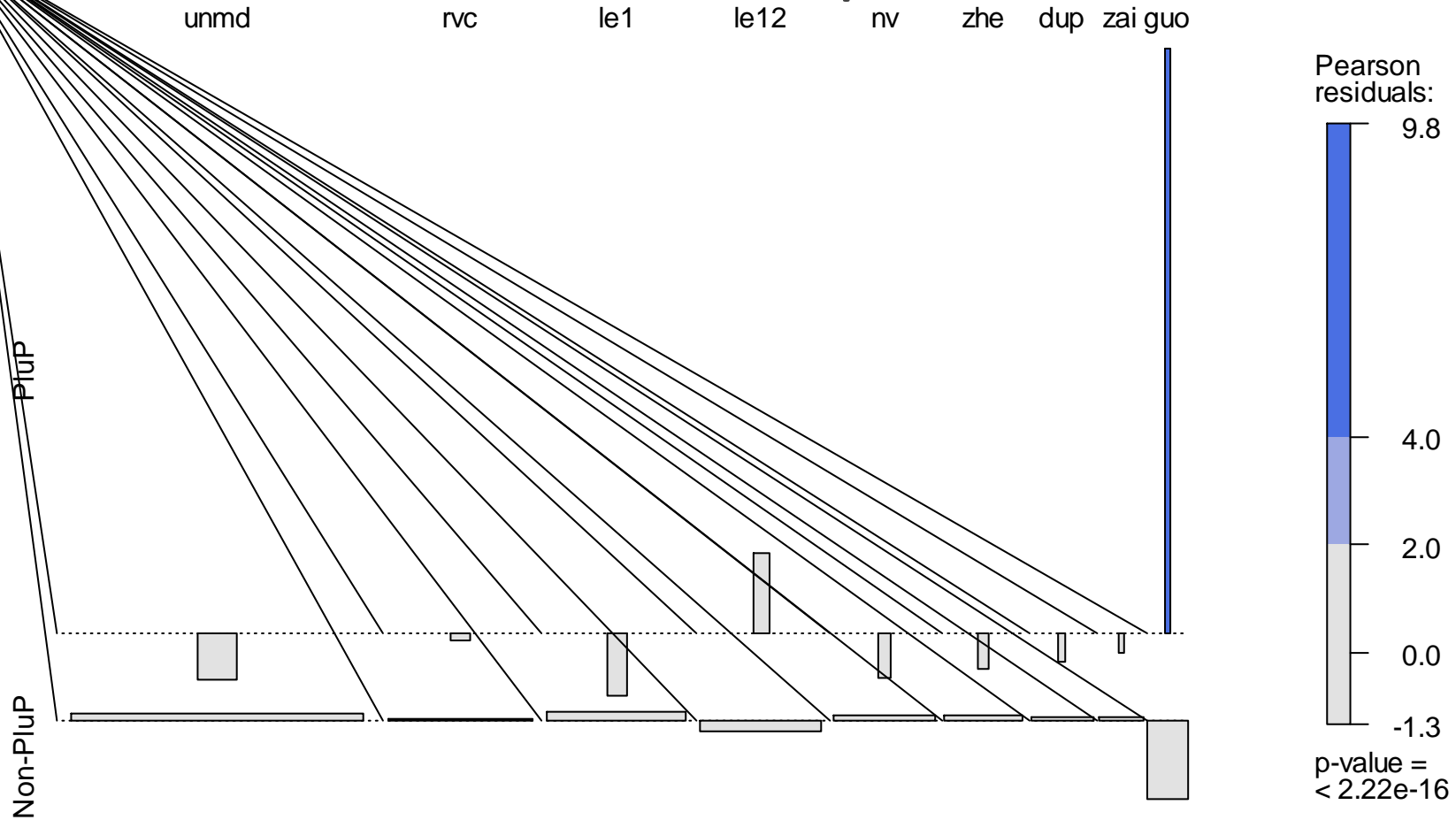
Association Plot of Nart 1



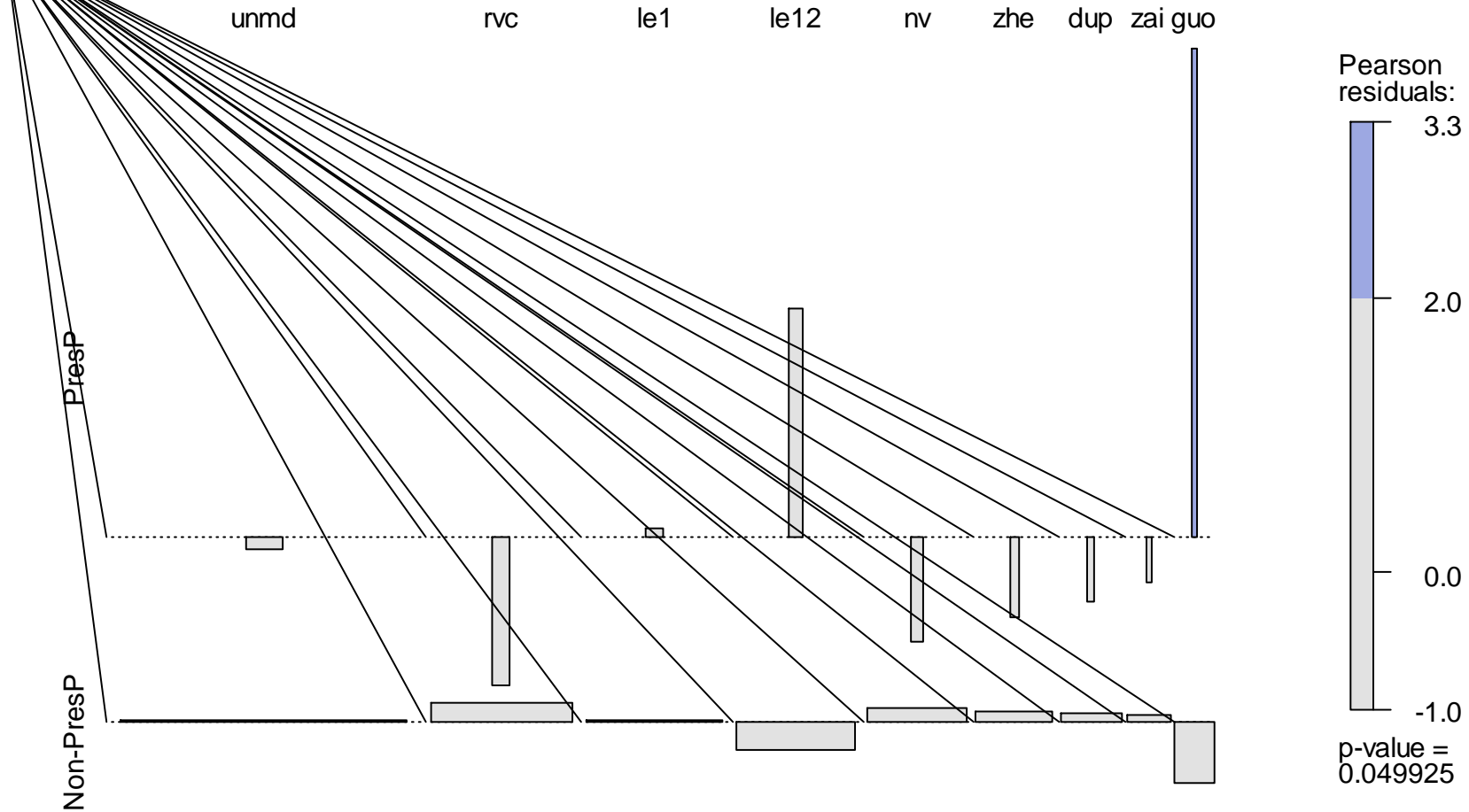
Association Plot of Nart 2



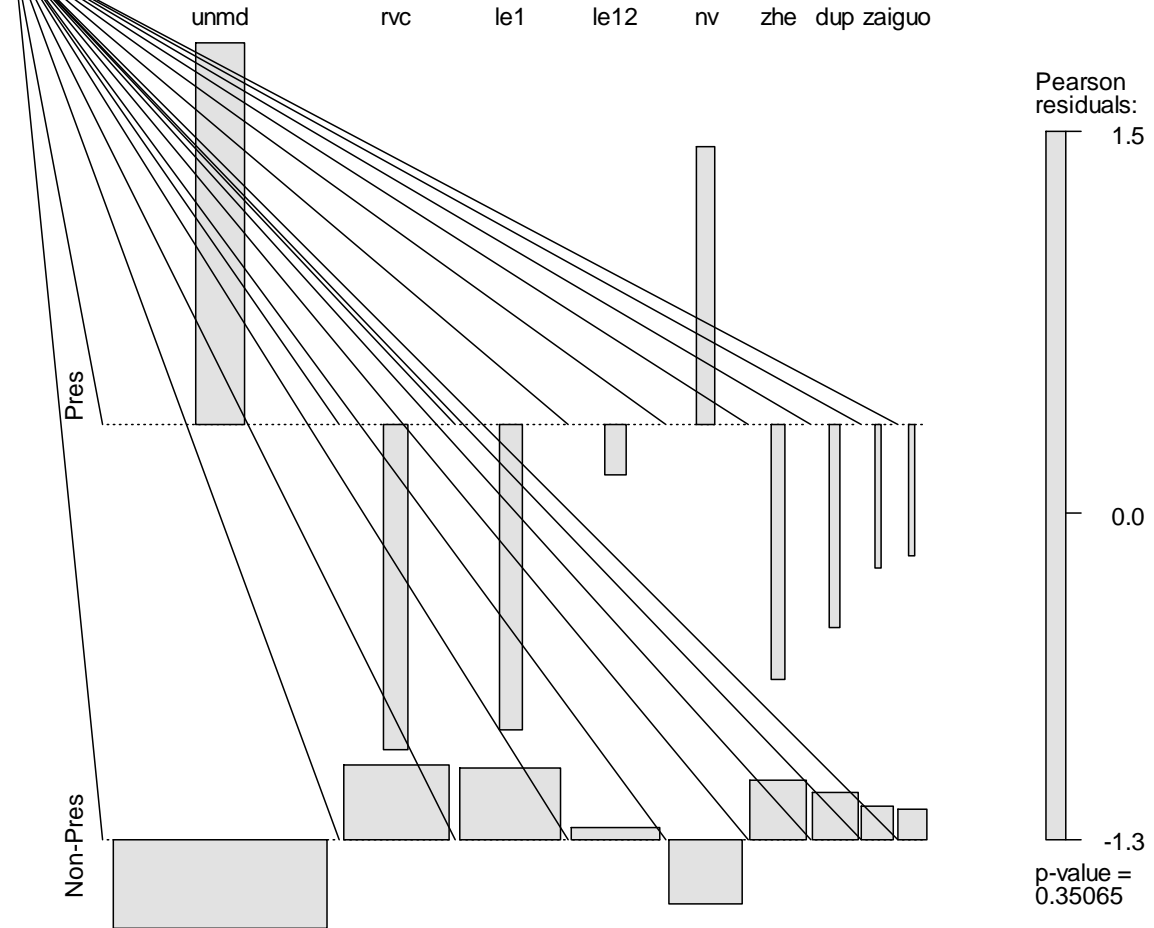
Association Plot of Pluperfect



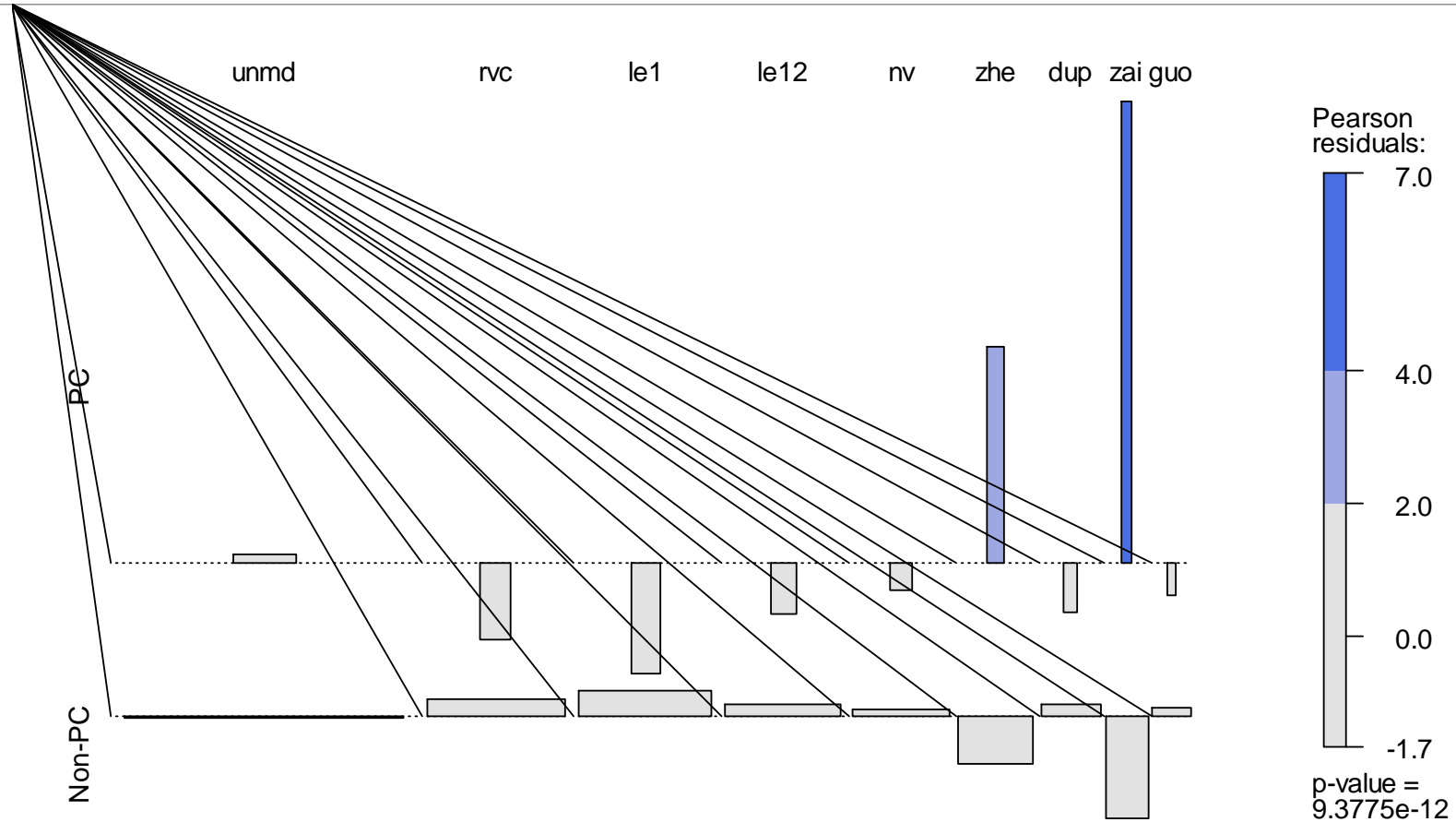
Association Plot of Pres.perfect



Association Plot of Present



Association Plot of Pt Cont



Association Plot of Pt Impf

