

Quantifying Translator Intervention with an Interlinear Baseline

Maciej Rapacz

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DH2026 · Daejeon · 30 July 2026



One passage, several translations



τὸν ἄρτον ἡμῶν τὸν ἐπιούσιον δὸς ἡμῖν σήμερον

Matthew 6:11

One passage, several translations



τὸν ἄρτον ἡμῶν τὸν ἐπιούσιον δὸς ἡμῖν σήμερον

Matthew 6:11

Give us this day our daily bread.

KJV

Give us today our daily bread.

NIV

One passage, several translations



τὸν ἄρτον ἡμῶν τὸν ἐπιούσιον δὸς ἡμῖν σήμερον

Matthew 6:11

Give us this day our daily bread.

KJV

Give us today our daily bread.

NIV

Give us today the food we need.

NLT

One passage, several translations



τὸν ἄρτον ἡμῶν τὸν ἐπιούσιον δὸς ἡμῖν σήμερον

Matthew 6:11

Give us this day our daily bread.

KJV

Give us today our daily bread.

NIV

Give us today the food we need.

NLT

Give us today our appointed bread.

LSV

Give us this day our supersubstantial bread.

DRA

One passage, several translations



τὸν ἄρτον ἡμῶν τὸν ἐπιούσιον δὸς ἡμῖν σήμερον

Matthew 6:11

Give us this day our daily bread.

KJV

Give us today our daily bread.

NIV

Give us today the food we need.

NLT

Give us today our appointed bread.

LSV

Give us this day our supersubstantial bread.

DRA

Keep us alive with three square meals.

The Message

Intervention in translation



“From the point of view of the target literature, all translation implies a degree of manipulation of the source text for a certain purpose.”

Theo Hermans · 1985

Intervention in translation



“From the point of view of the target literature, all translation implies a degree of manipulation of the source text for a certain purpose.”

Theo Hermans · 1985

add · omit · simplify · explain · reinterpret

What we are looking for



What we are looking for



Vinay & Darbelnet	procedures	borrowing · calque · literal translation · transposition modulation · equivalence · adaptation
Catford	shifts	level · structure · class · unit/rank · intra-system
Chesterman	strategies	syntactic · semantic · pragmatic · explicitness cultural filtering · information change · paraphrase
Molina & Hurtado Albir	techniques	amplification/reduction · compensation · description generalisation/particularisation · discursive creation · variation
Blum-Kulka · Baker · Laviosa	tendencies / “universals”	explicitation · simplification · normalisation · levelling-out

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taxonomy-independent

no predefined labels

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not discrete

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taxonomy-independent

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not corpus-relative

passage-level

one passage is enough

Literary translation



Literary translation



Ἐγένετο ἄνθρωπος
ἀπεσταλμένος...

There came a man who
was sent...

Literary translation



Ἐγένετο ἄνθρωπος
ἀπεσταλμένος...

●
source

There came a man who
was sent...

●
literary

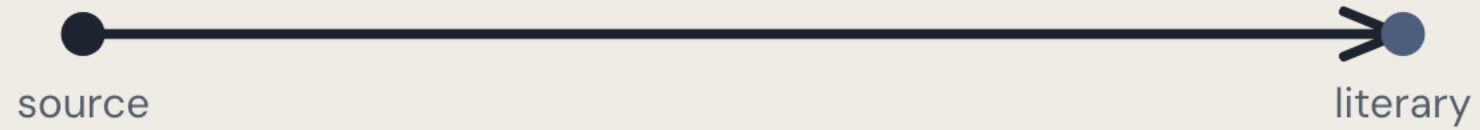
Literary translation



●
source

●
literary

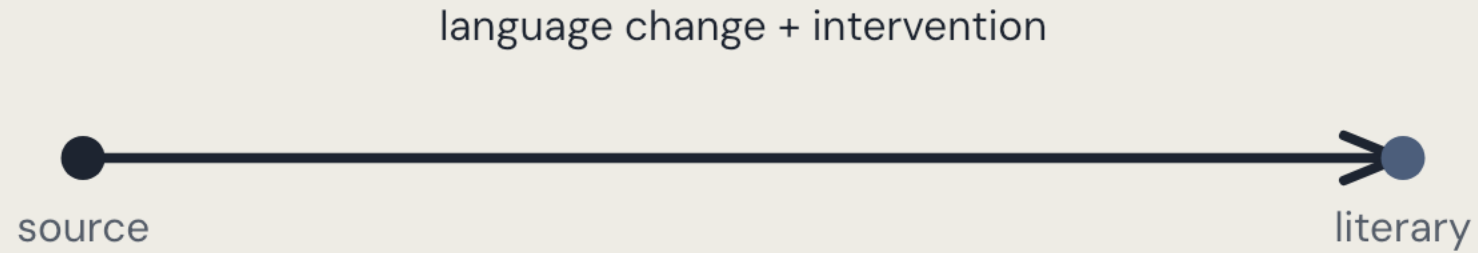
Literary translation



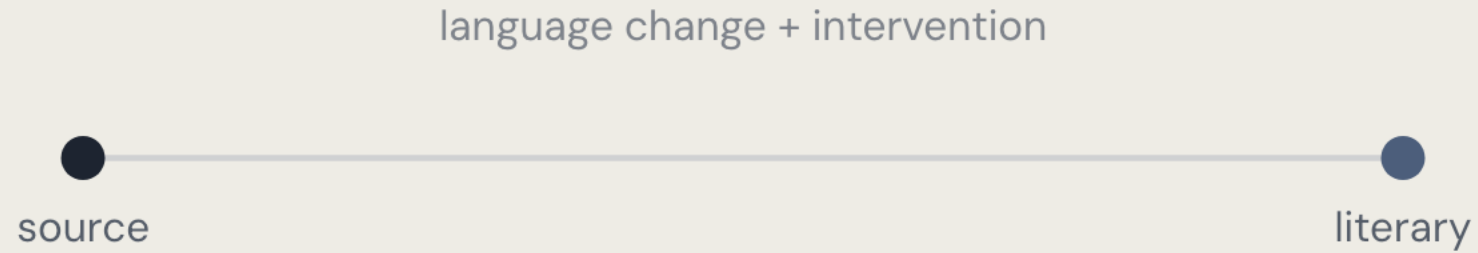
Literary translation as algebraic translation



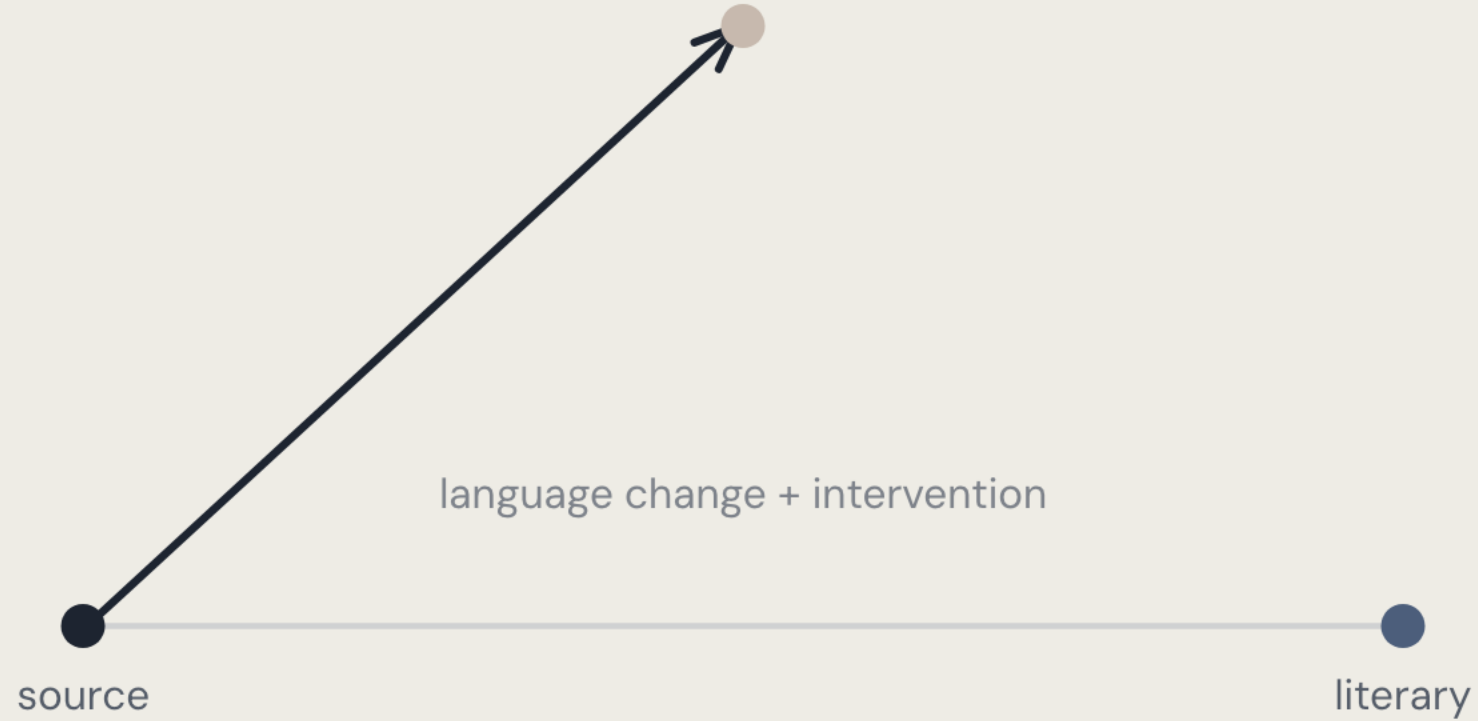
Literary translation as algebraic translation



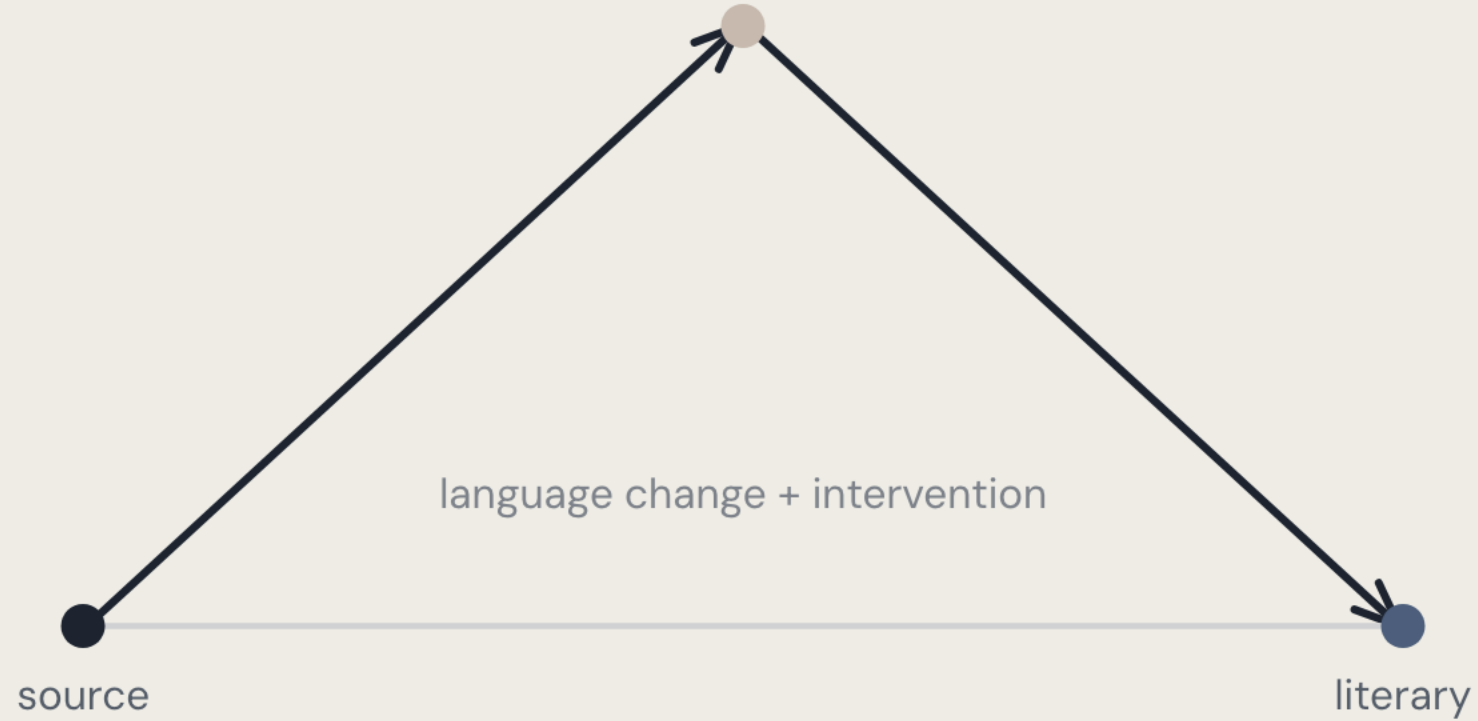
Literary translation as algebraic translation



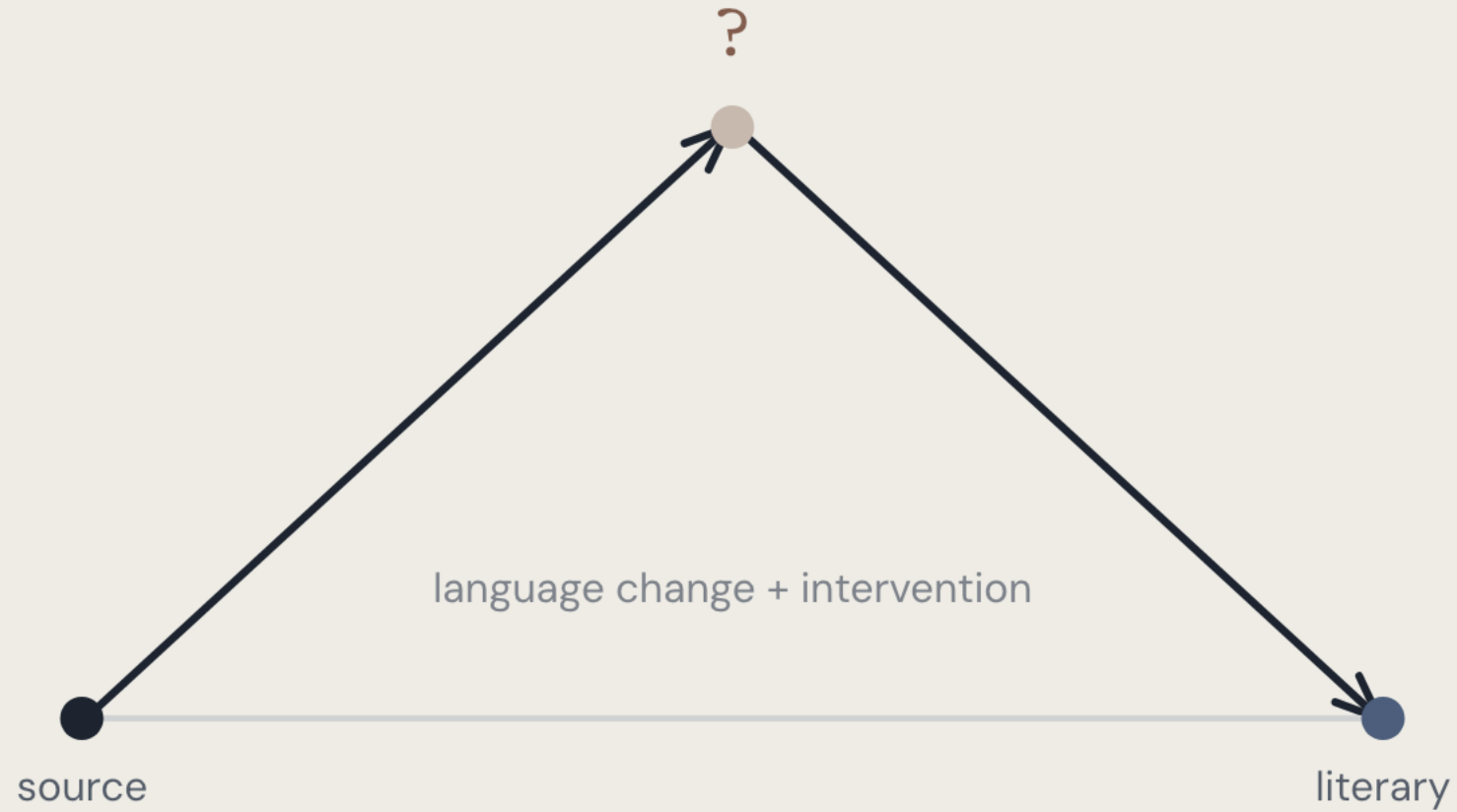
Literary translation as algebraic translation



Literary translation as algebraic translation



Literary translation as algebraic translation



Interlinear translation



Interlinear translation



Ἐγένετο ἄνθρωπος ἀπεσταλμένος παρὰ θεοῦ ὄνομα αὐτῷ Ἰωάννης

John 1:6

Interlinear translation



Ἐγένετο ἄνθρωπος ἀπεσταλμένος παρὰ θεοῦ ὄνομα αὐτῷ Ἰωάννης

Became

John 1:6

Interlinear translation



Ἐγένετο

ἄνθρωπος

ἀπεσταλμένος

παρὰ

θεοῦ

ὄνομα

αὐτῷ

Ἰωάννης

Became

a man

John 1:6

Interlinear translation



Ἐγένετο

ἄνθρωπος

ἀπεσταλμένος

παρὰ

θεοῦ

ὄνομα

αὐτῷ

Ἰωάννης

Became

a man

sent

John 1:6

Interlinear translation



Ἐγένετο

ἄνθρωπος

ἀπεσταλμένος

παρὰ

θεοῦ

ὄνομα

αὐτῷ

Ἰωάννης

Became

a man

sent

from

John 1:6

Interlinear translation



Ἐγένετο	ἄνθρωπος	ἀπεσταλμένος	παρὰ	θεοῦ	ὄνομα	αὐτῷ	Ἰωάννης
Became	a man	sent	from	God			

John 1:6

Interlinear translation



Ἐγένετο	ἄνθρωπος	ἀπεσταλμένος	παρὰ	θεοῦ	ὄνομα	αὐτῷ	Ἰωάννης
Became	a man	sent	from	God	name		

John 1:6

Interlinear translation



Ἐγένετο	ἄνθρωπος	ἀπεσταλμένος	παρὰ	θεοῦ	ὄνομα	αὐτῷ	Ἰωάννης
Became	a man	sent	from	God	name	to him	

John 1:6

Interlinear translation



Ἐγένετο	ἄνθρωπος	ἀπεσταλμένος	παρὰ	θεοῦ	ὄνομα	αὐτῷ	Ἰωάννης
Became	a man	sent	from	God	name	to him	John

John 1:6

Interlinear translation



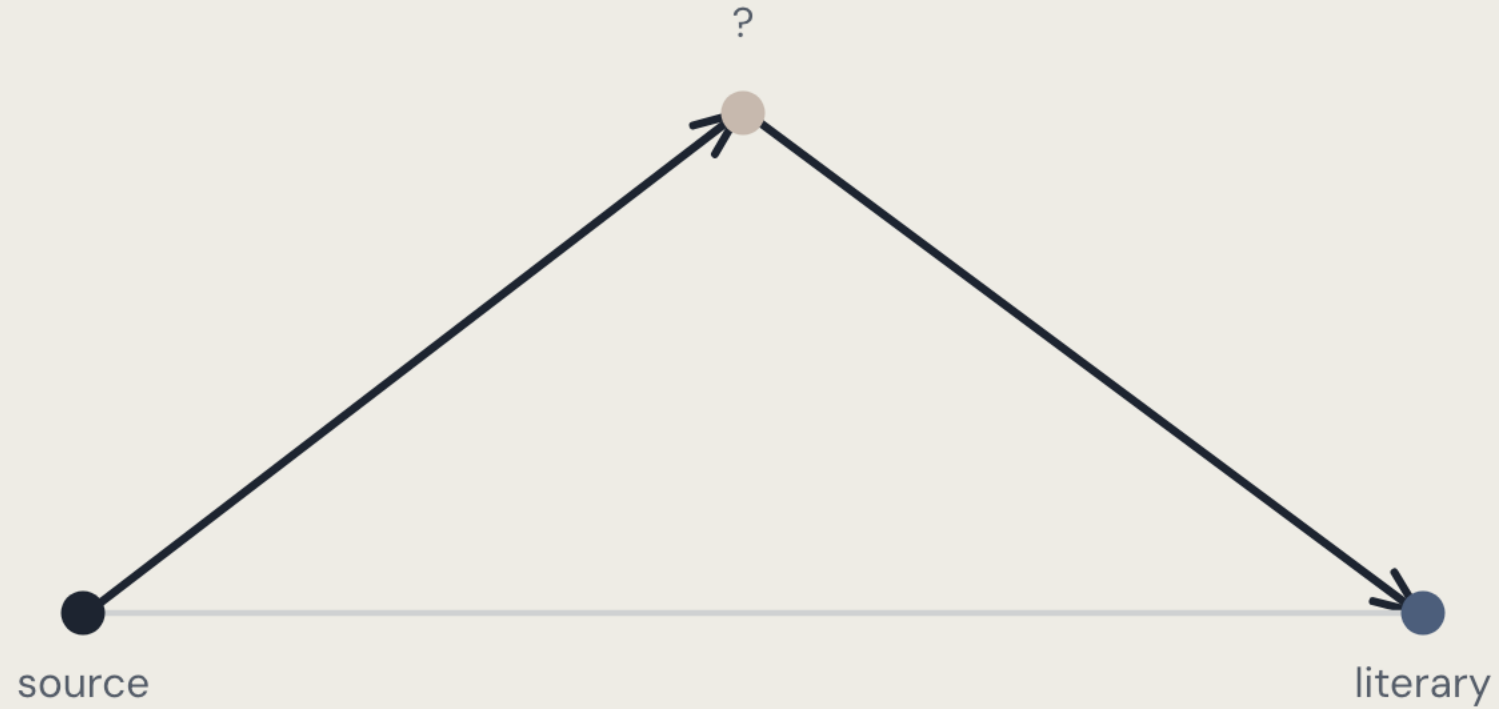
Ἐγένετο	ἄνθρωπος	ἀπεσταλμένος	παρὰ	θεοῦ	ὄνομα	αὐτῷ	Ἰωάννης
Became	a man	sent	from	God	name	to him	John

John 1:6

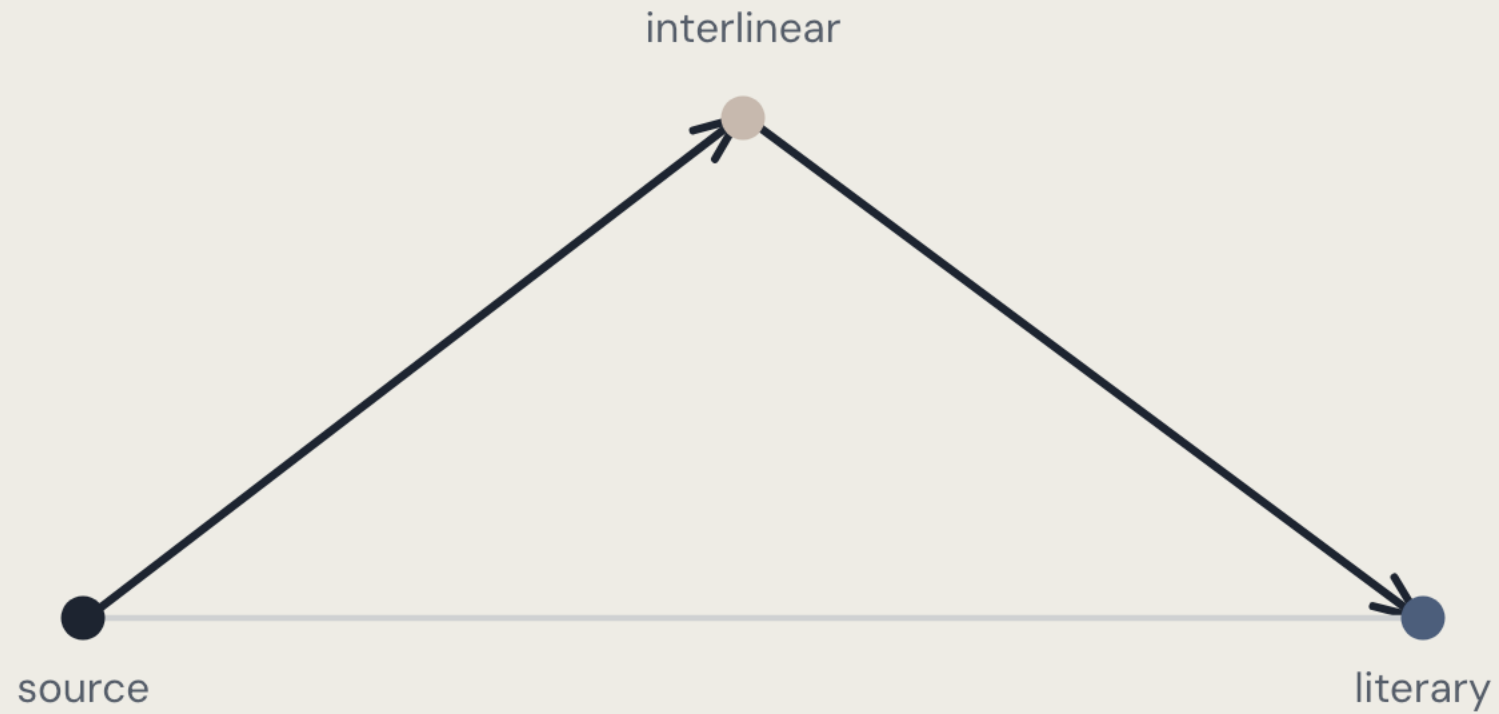
“The interlinear version of the Scriptures is the prototype or ideal of all translation.”

Walter Benjamin

The missing point



The missing point



The Intervention Vector



$$\boldsymbol{v}_{\text{intervention}} = \boldsymbol{v}_{\text{literary}} - \boldsymbol{v}_{\text{interlinear}}$$

The Intervention Vector



$$\mathbf{v}_{\text{intervention}} = \mathbf{v}_{\text{literary}} - \mathbf{v}_{\text{interlinear}}$$

$$\begin{aligned} \mathbf{v}_{\text{intervention}} = & [E(\text{literary}) - E(\text{source})] \\ & - [E(\text{interlinear}) - E(\text{source})] \end{aligned}$$

The Intervention Vector



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$$\mathbf{v}_{\text{intervention}} = E(\text{literary}) - E(\text{interlinear})$$

target language only

Two hypotheses



$$v_{\text{intervention}} = v_{\text{literary}} - v_{\text{interlinear}}$$

Two hypotheses



$$v_{\text{intervention}} = v_{\text{literary}} - v_{\text{interlinear}}$$

$$\|v_{\text{intervention}}\| \approx \text{extent?}$$

Two hypotheses



$$\boldsymbol{v}_{\text{intervention}} = \boldsymbol{v}_{\text{literary}} - \boldsymbol{v}_{\text{interlinear}}$$

$$\|\boldsymbol{v}_{\text{intervention}}\| \approx \text{extent?}$$

$$\frac{\boldsymbol{v}_{\text{intervention}}}{\|\boldsymbol{v}_{\text{intervention}}\|} \approx \text{character?}$$



Evaluation

Evaluation setup



Evaluation setup



targum.net

Evaluation setup



targum.net

74

translation records

5

languages

260

chapters

5

interlinear baselines

Evaluation setup



targum.net

74

translation records

5

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5

interlinear baselines

EN biblehub.com · FR editeurbpc.com · IT altervista.org · PL oblubienica.eu · ES bibliatodo.com

Evaluation setup



targum.net

Qwen3-Embedding-8B

74

translation records

5

languages

260

chapters

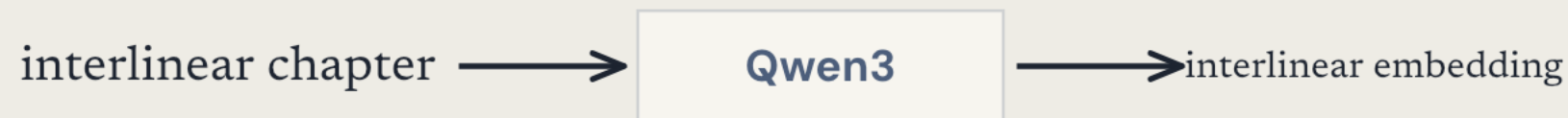
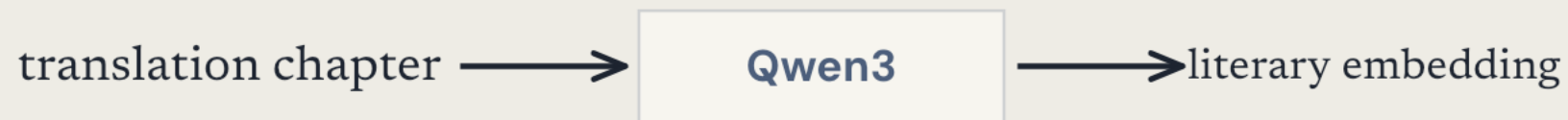
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interlinear baselines

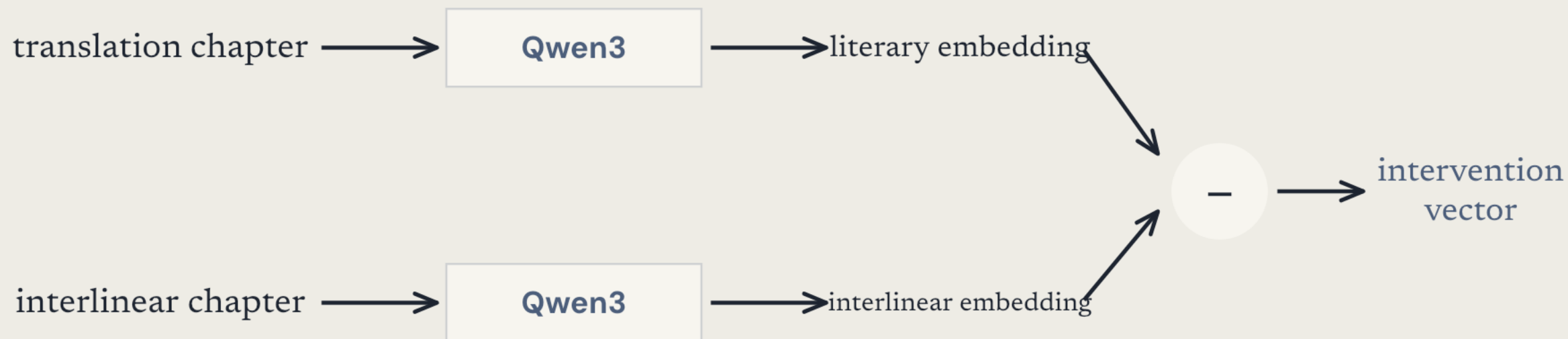
EN biblehub.com · FR editeurbpc.com · IT altermvista.org · PL oblubienica.eu · ES bibliatodo.com

	Literal	Formal	Dynamic	Paraphrase
English	3	4	7	2
French	1	6	4	3
Italian	4	4	2	2
Polish	4	7	2	3
Spanish	3	2	5	6

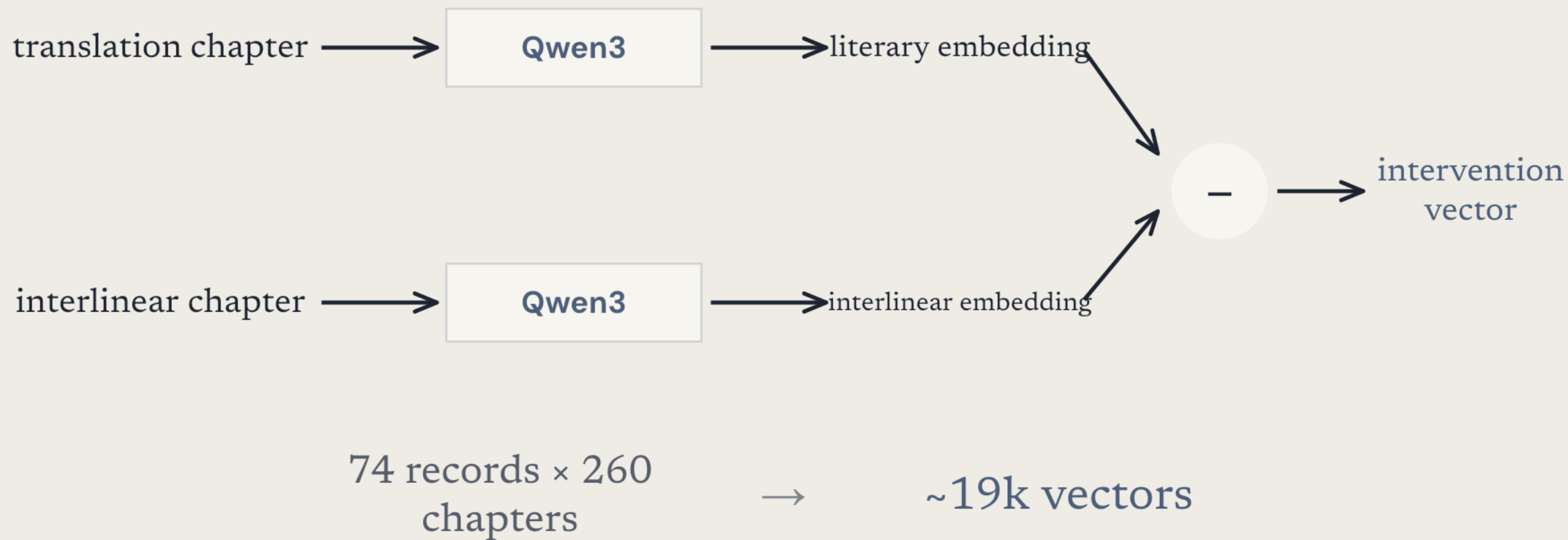
Calculating intervention vectors



Calculating intervention vectors



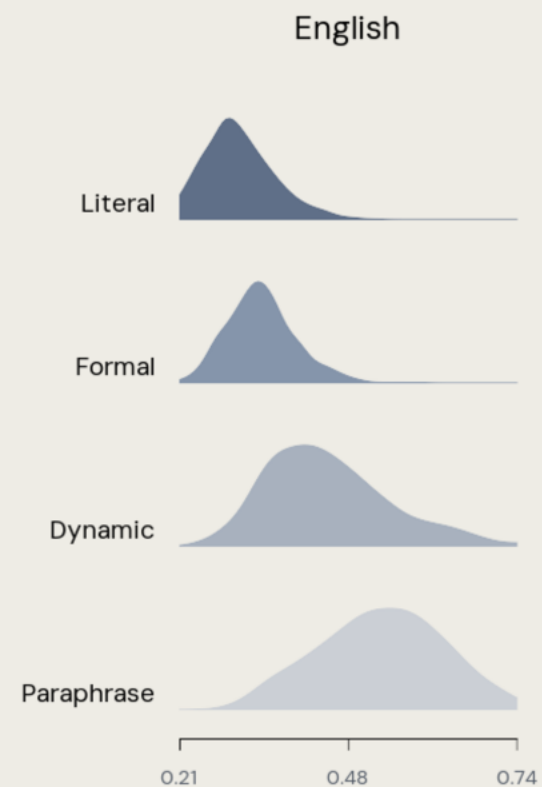
Calculating intervention vectors



Magnitude distributions

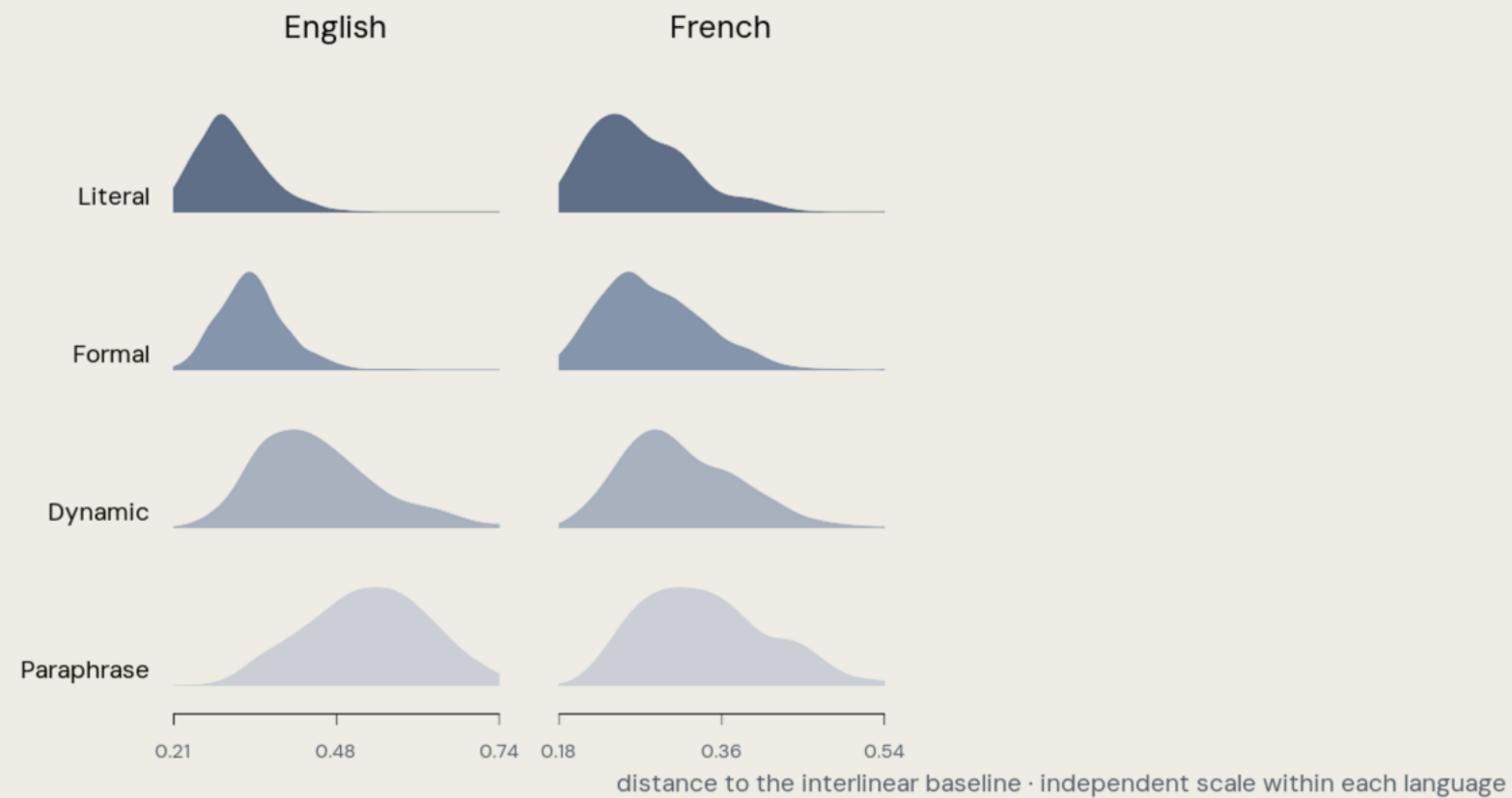


Magnitude distributions

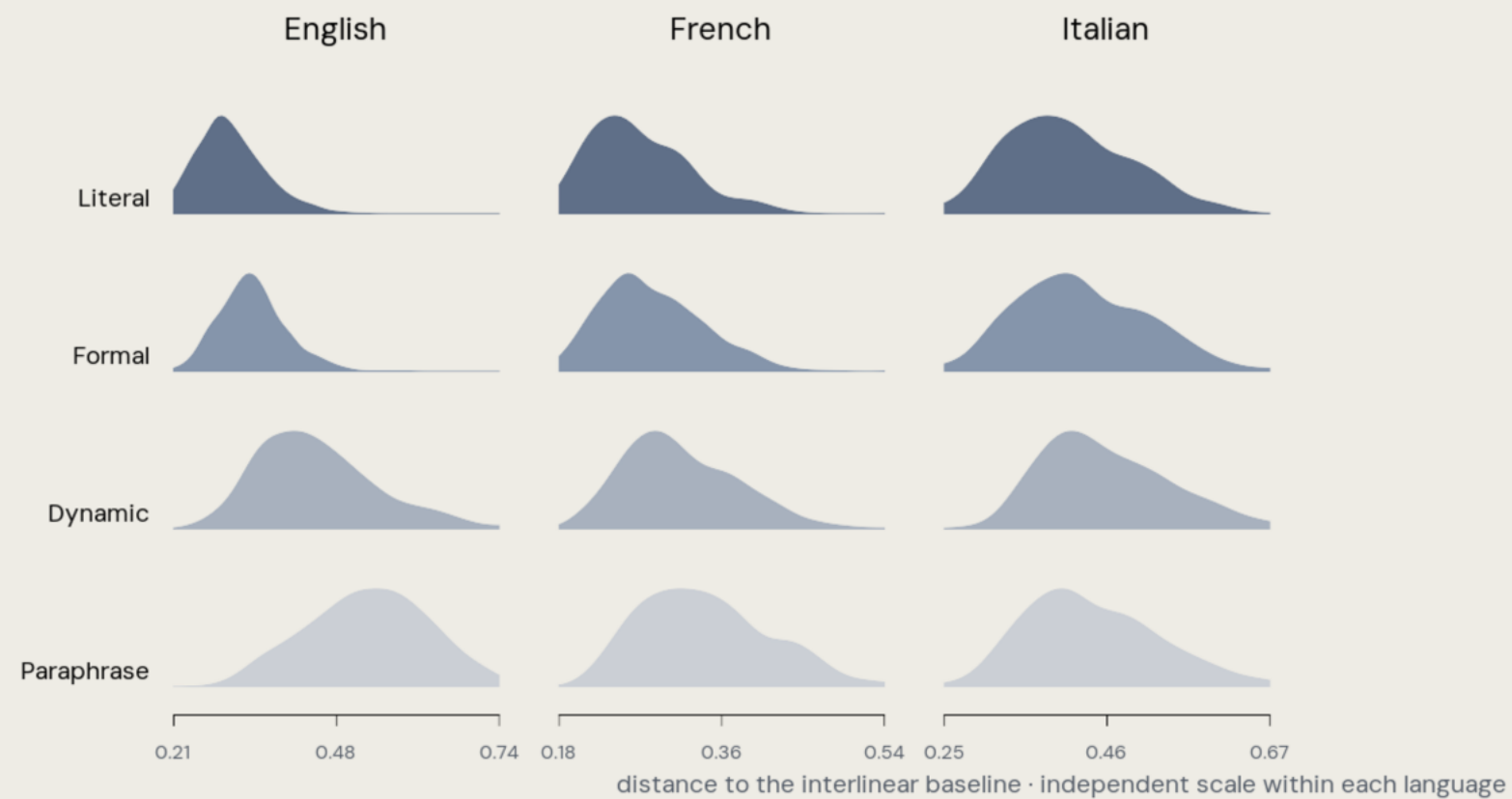


distance to the interlinear baseline · independent scale within each language

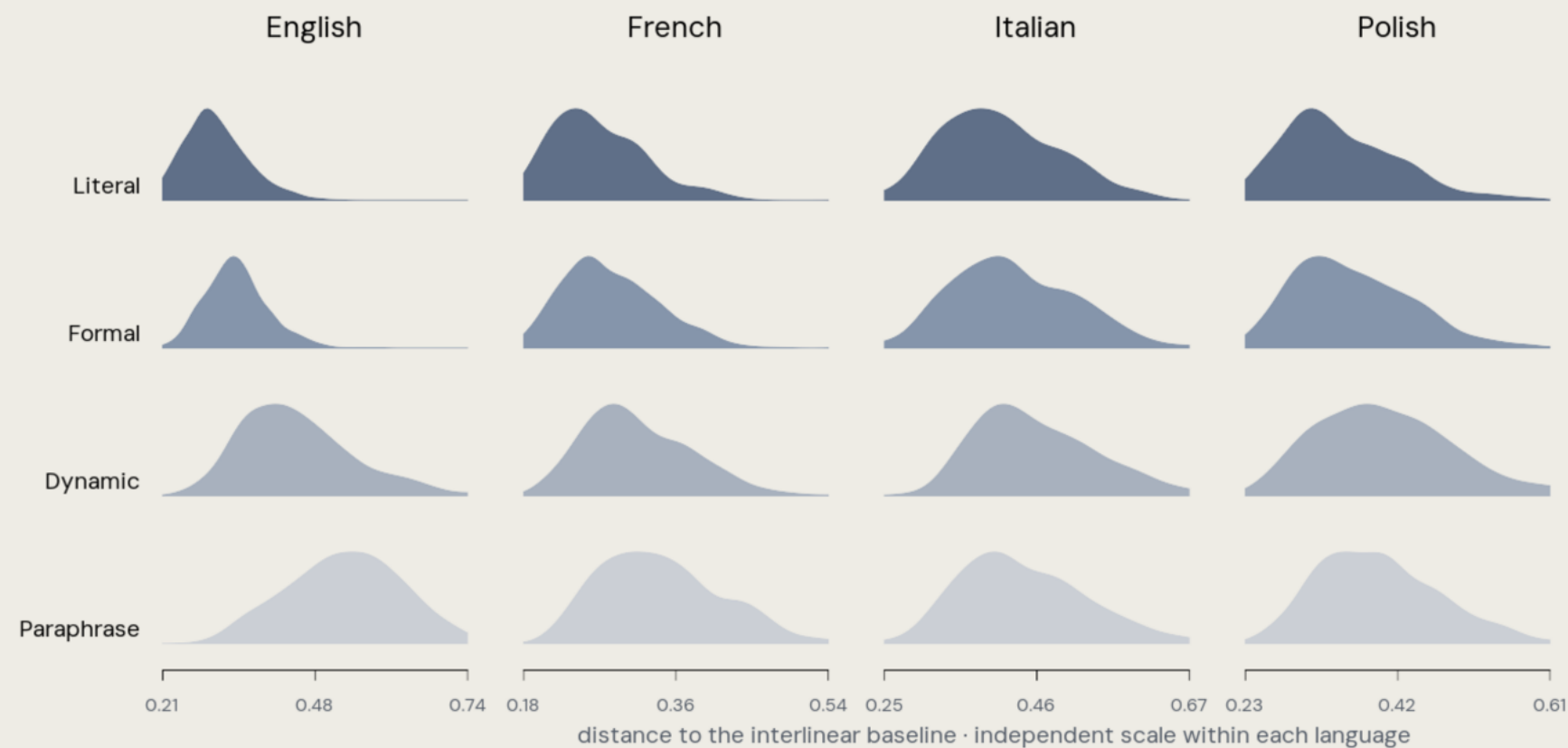
Magnitude distributions



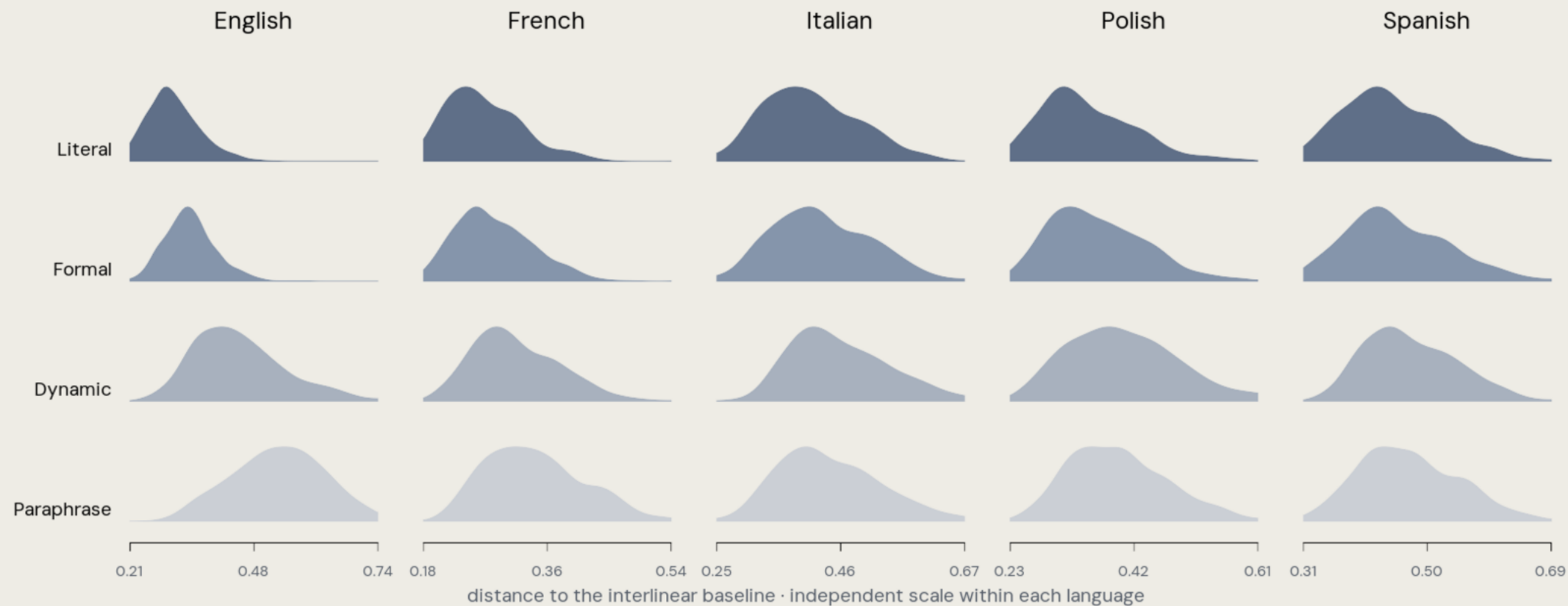
Magnitude distributions



Magnitude distributions



Magnitude distributions



Group comparisons



Group comparisons



one-sided Mann–Whitney U · Bonferroni corrected

row < column

reverse

n.s.

Group comparisons



one-sided Mann-Whitney U · Bonferroni corrected

row < column

reverse

n.s.

Translation comparisons



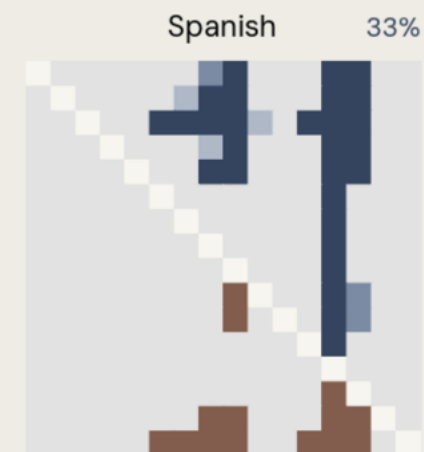
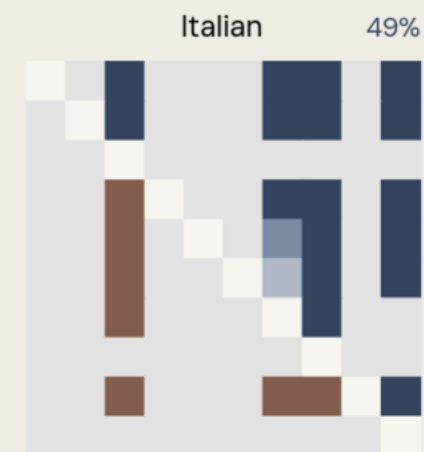
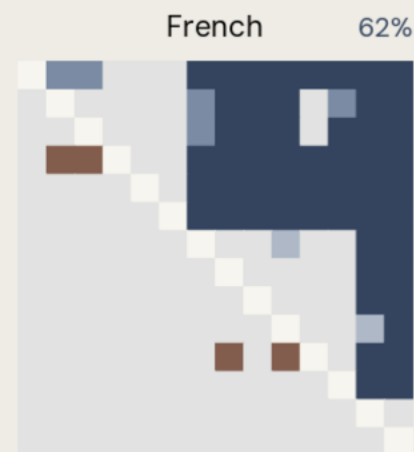
Translation comparisons



■ row < column ■ reverse ■ n.s.

% significant unordered pairs · adjusted $p < 0.001$

Translation comparisons



■ row < column ■ reverse ■ n.s.

% significant unordered pairs · adjusted $p < 0.001$

Three embedding models



Three embedding models



Model

Context window

Embedding size

Qwen3-Embedding-8B

32,768

4,096

Three embedding models



Model	Context window	Embedding size
Qwen3-Embedding-8B	32,768	4,096
llama-embed-nemotron-8b	32,768	4,096
LaBSE	up to 512	768

Group comparisons across models



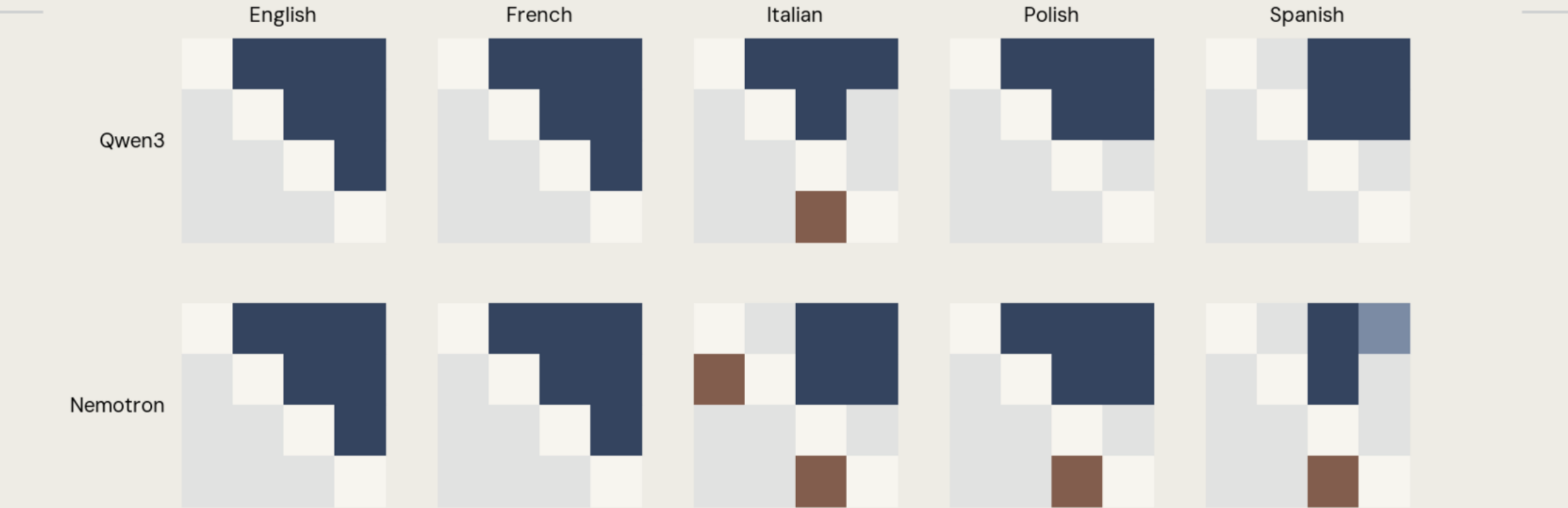
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Qwen3

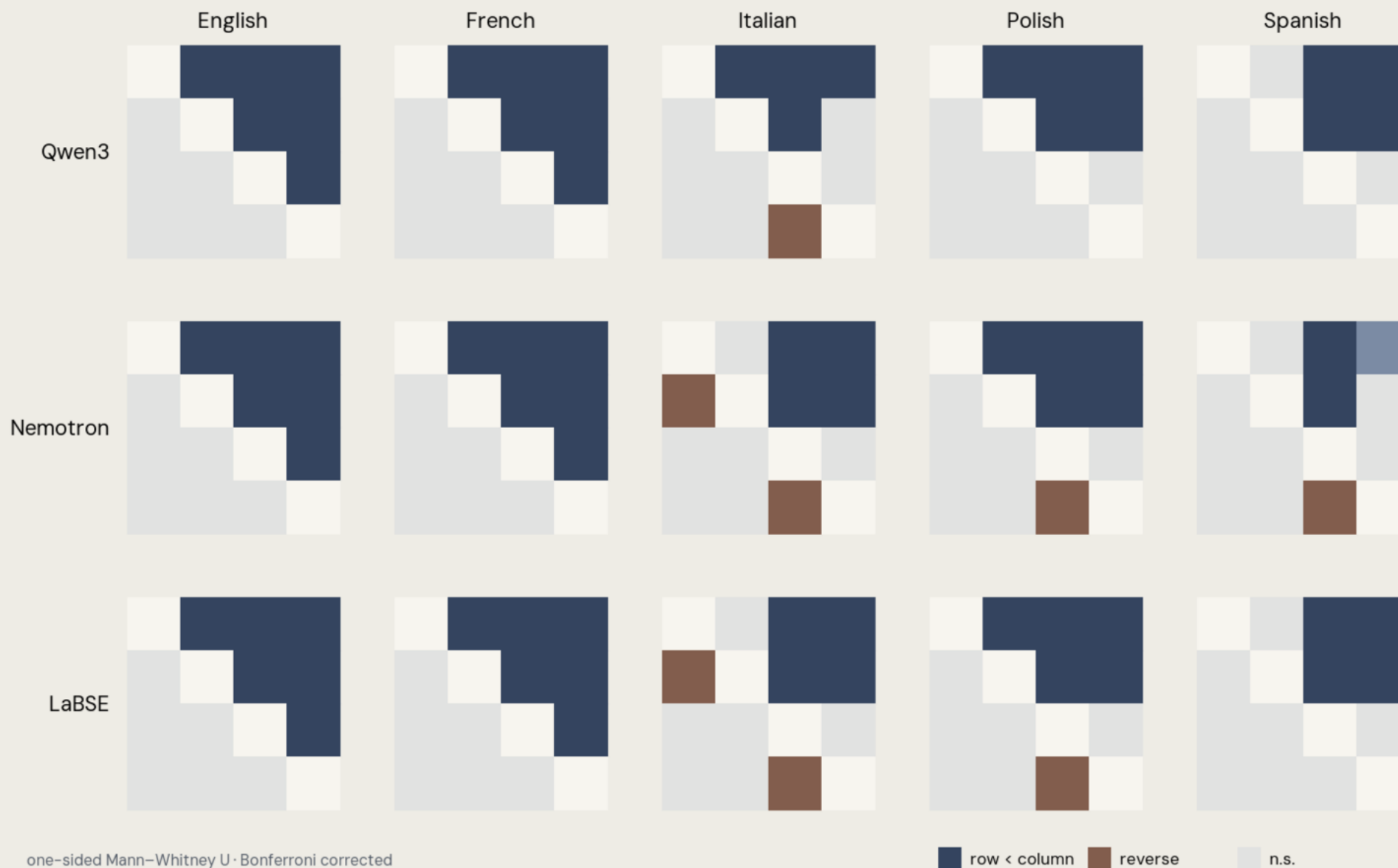


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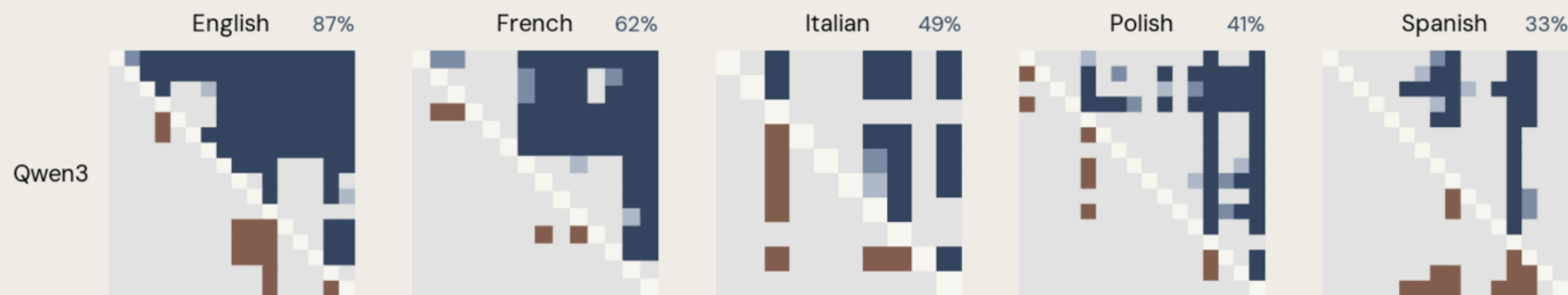
Group comparisons across models



Group comparisons across models



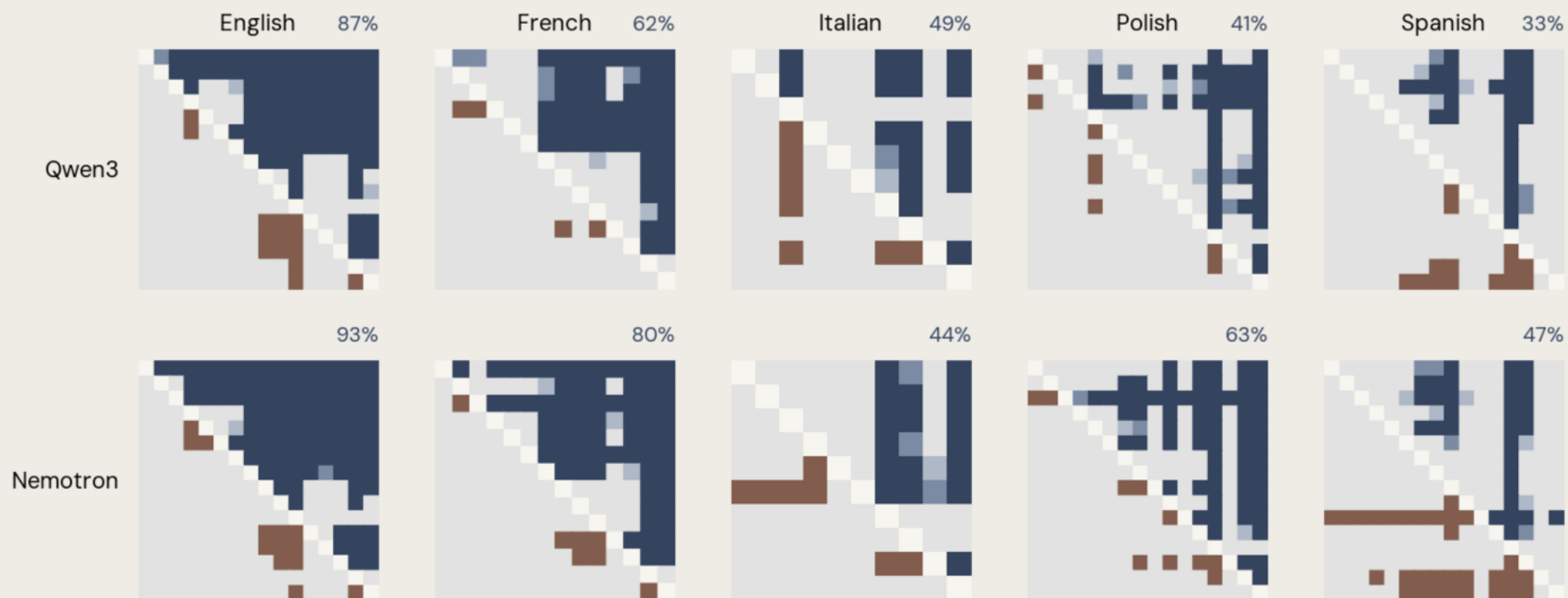
Translation comparisons across models



■ row < column ■ reverse ■ n.s.

% significant unordered pairs · adjusted $p < 0.001$

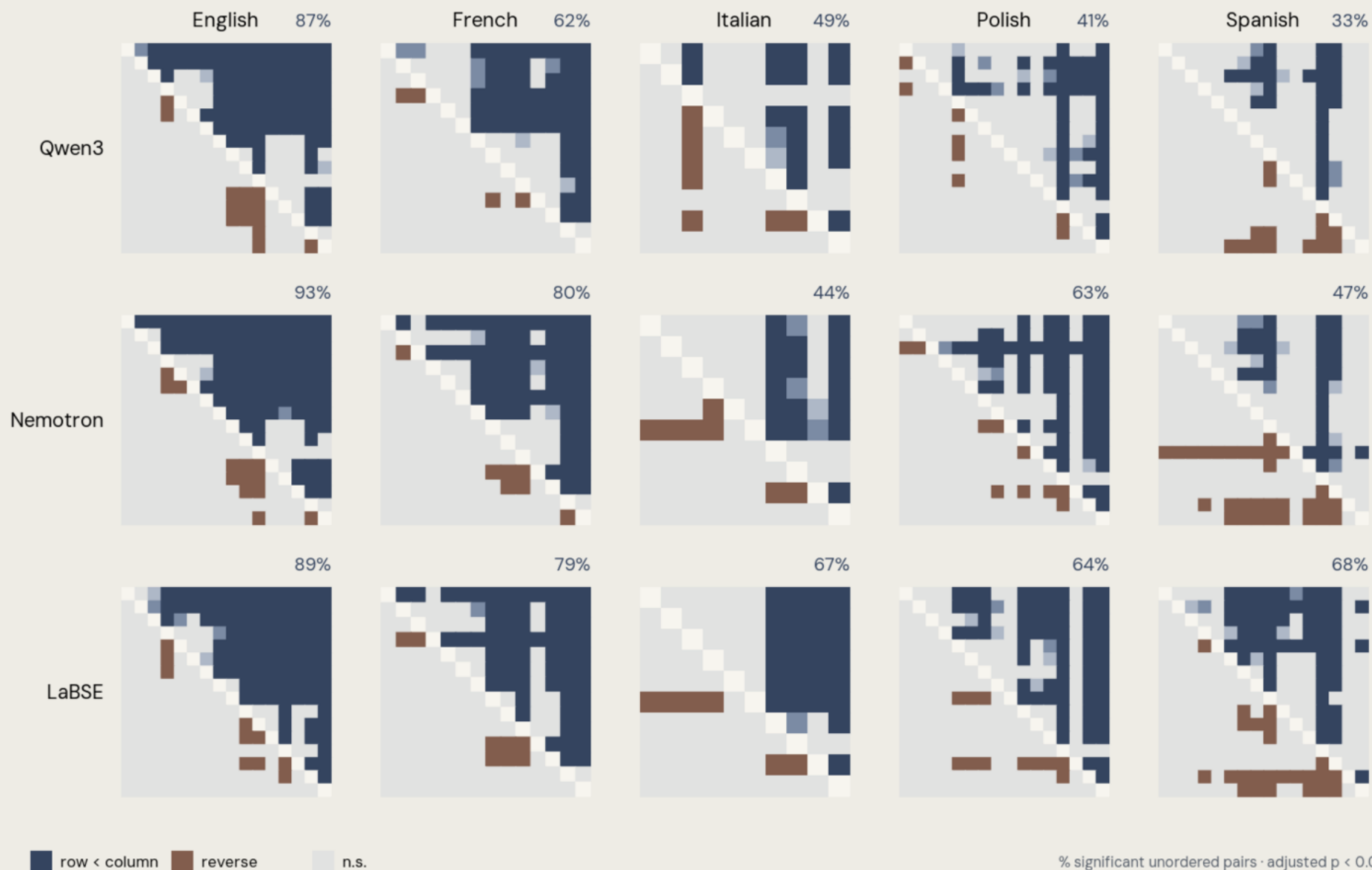
Translation comparisons across models



■ row < column ■ reverse ■ n.s.

% significant unordered pairs · adjusted $p < 0.001$

Translation comparisons across models





magnitude



direction

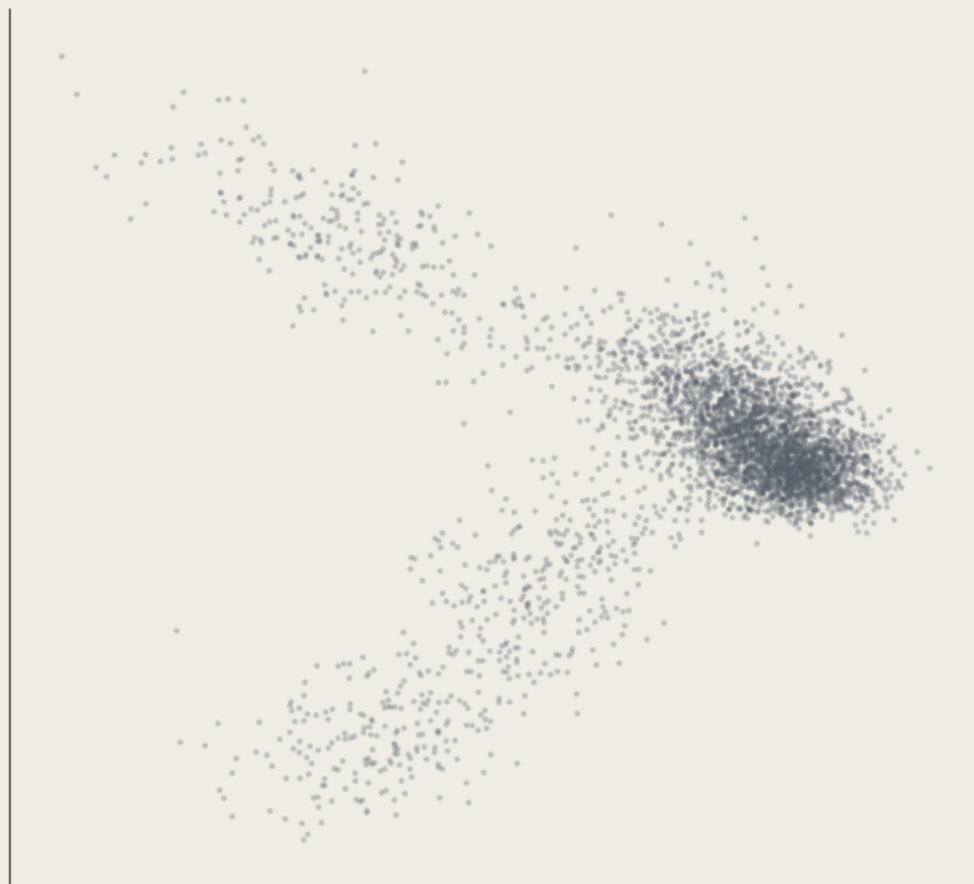
Intervention topology



Intervention topology



English



French



Italian



Polish

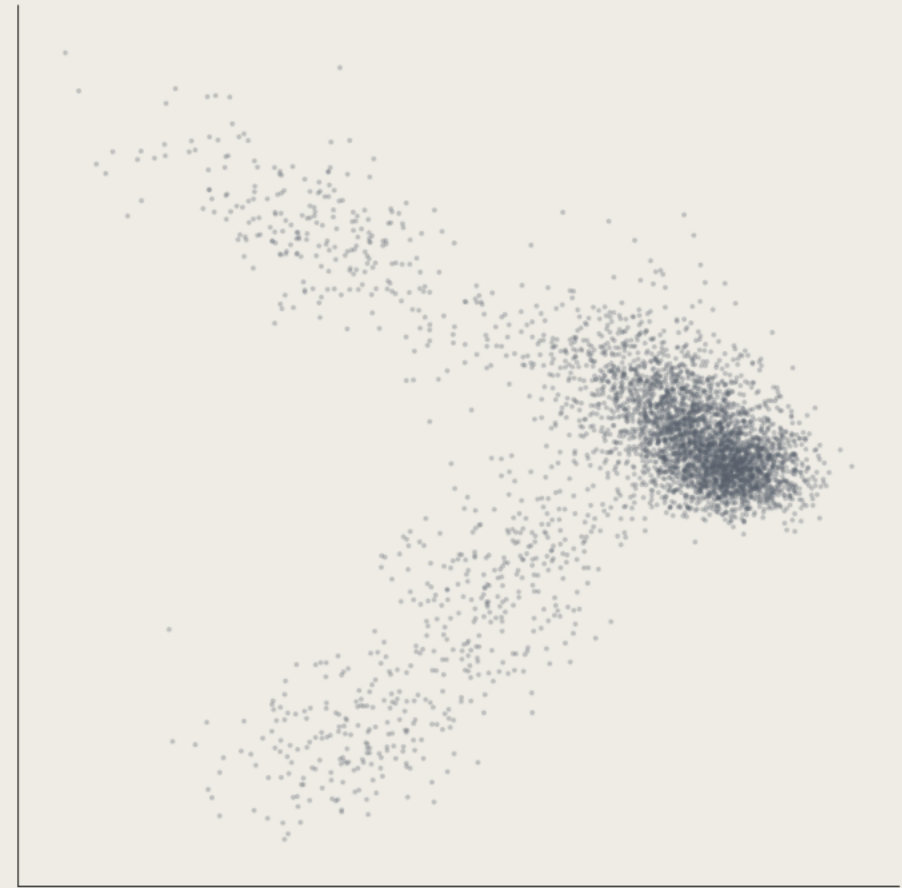


Spanish



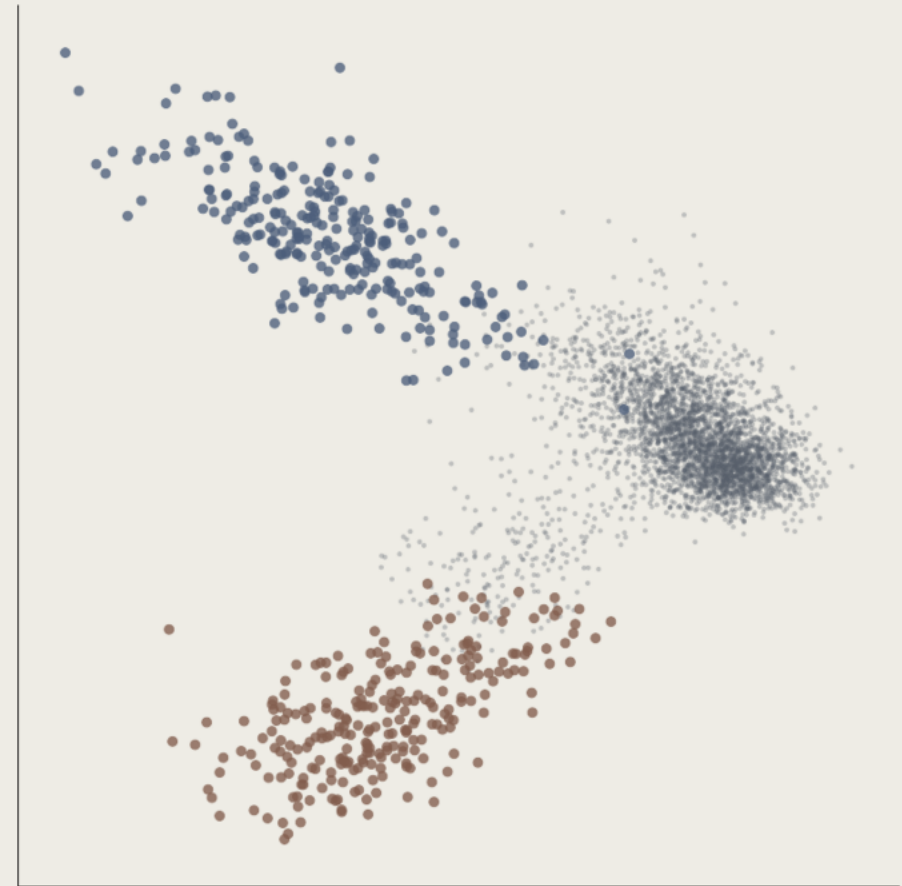
one point per translation × chapter · PCA fitted separately within each language

English topology



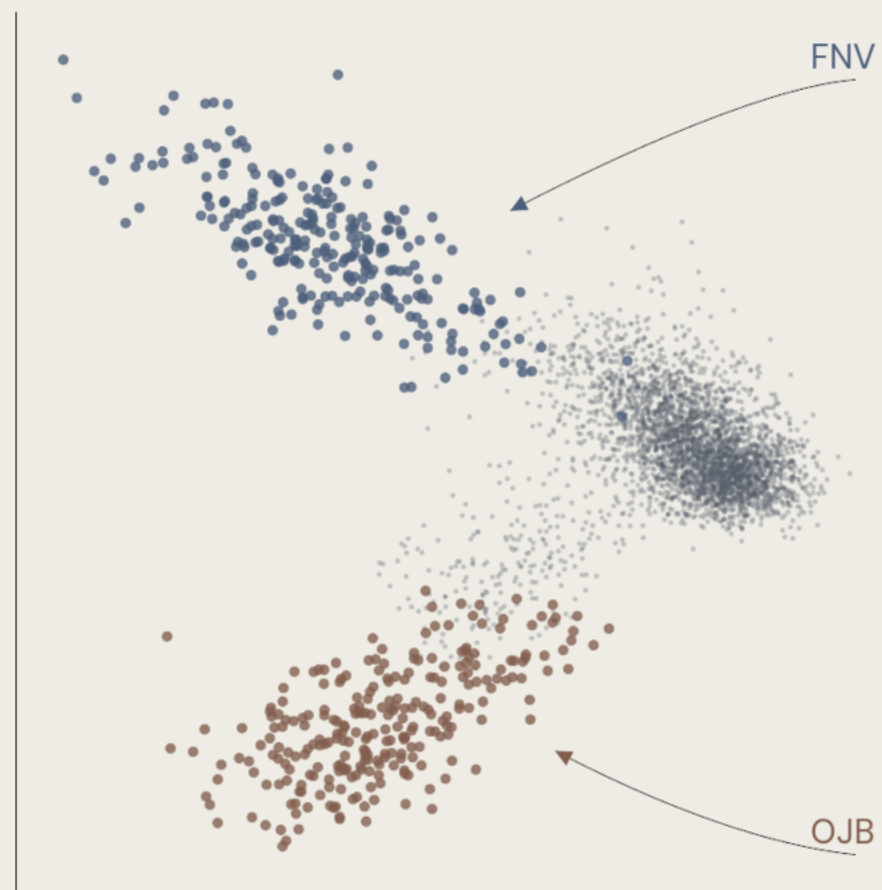
English chapter-level intervention topology · one point per translation × chapter

English topology



English chapter-level intervention topology · one point per translation × chapter

English topology



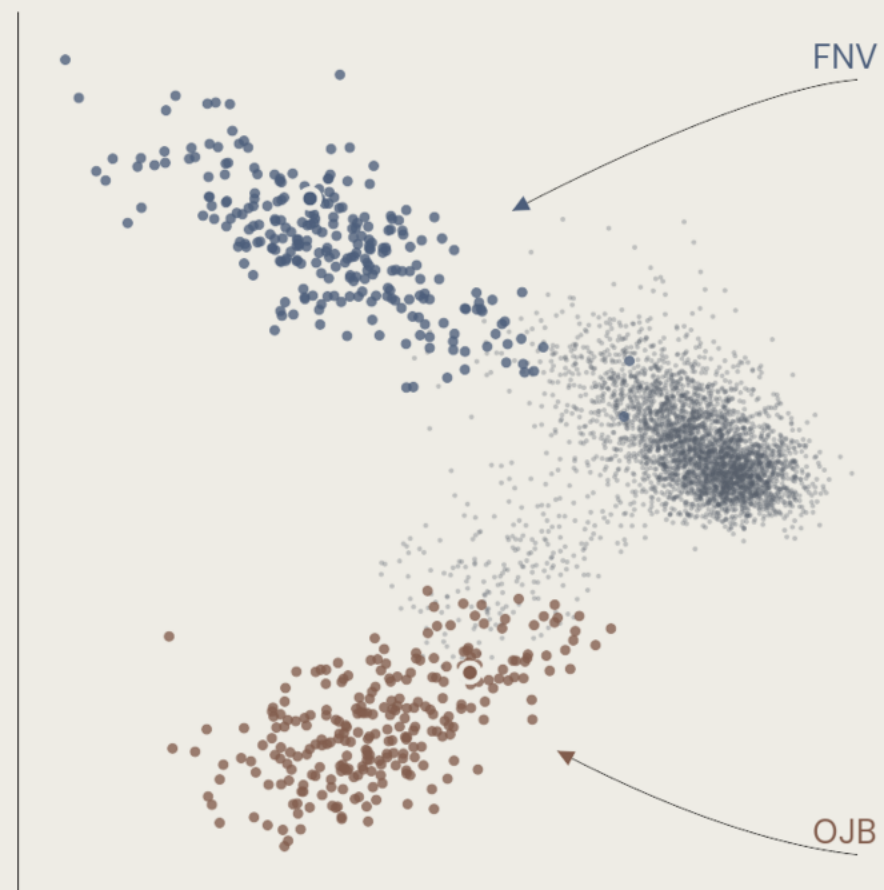
English chapter-level intervention topology · one point per translation × chapter

Acts 17:33



Greek

Οὕτως ὁ Παῦλος ἐξῆλθεν ἐκ μέσου αὐτῶν.



English chapter-level intervention topology · ACT 17 highlighted

Acts 17:33

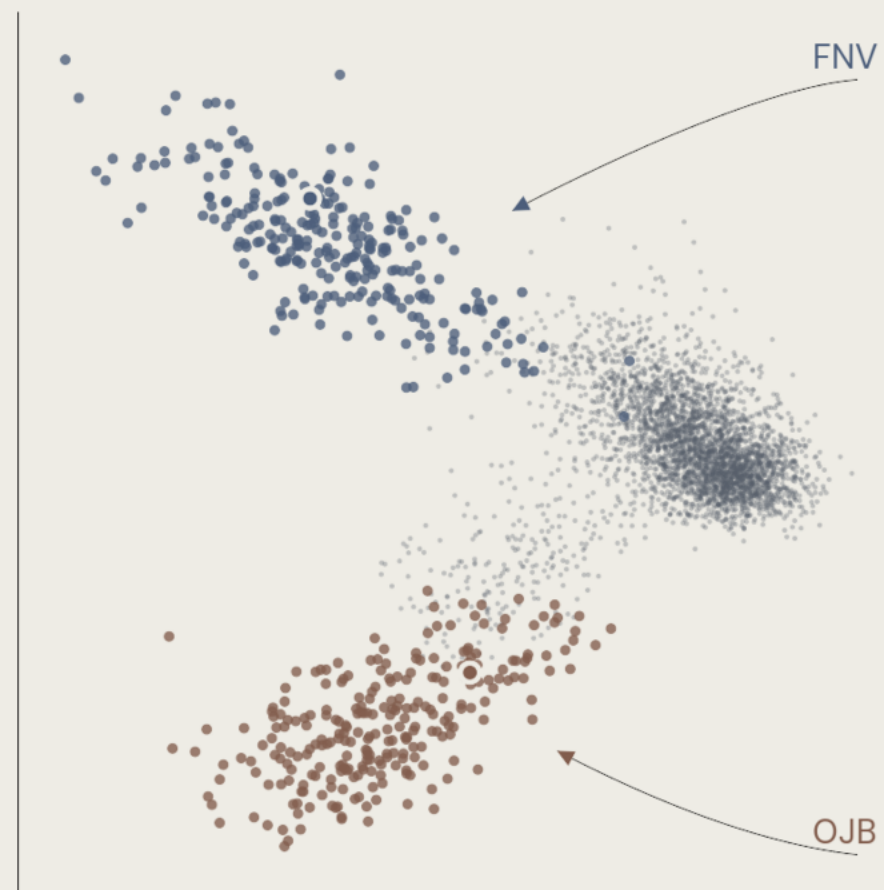


Greek

Οὕτως ὁ Παῦλος ἐξῆλθεν ἐκ μέσου αὐτῶν.

Interlinear

Thus Paul went out from the midst of them.



Acts 17:33



Greek

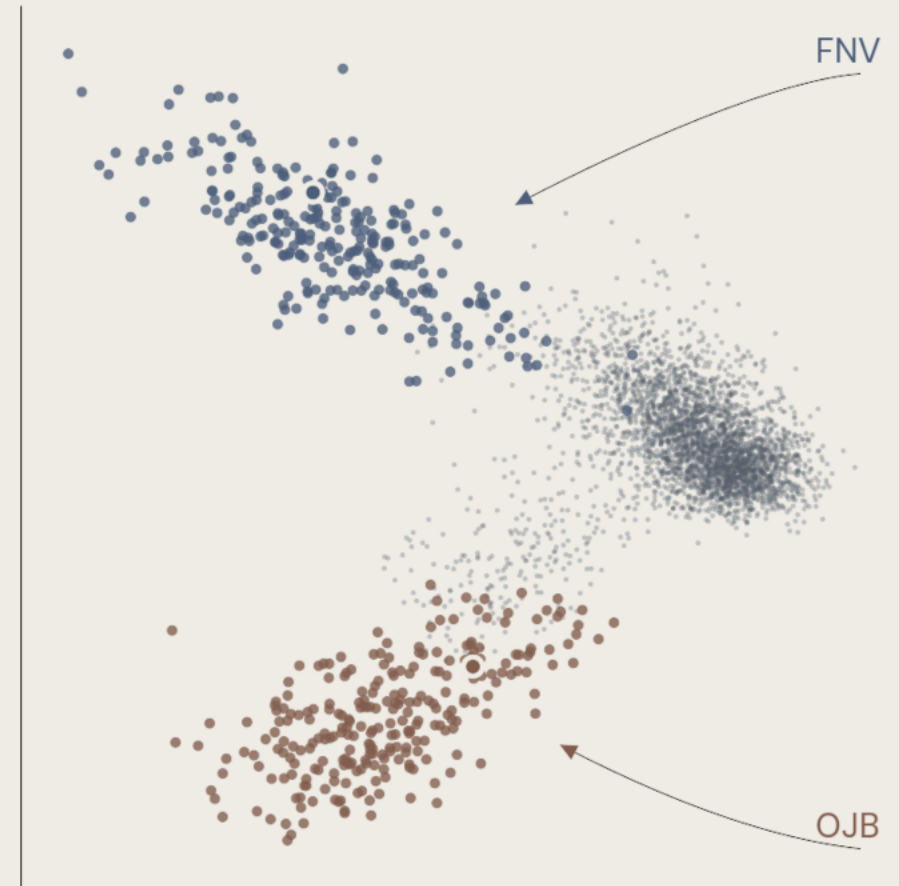
Οὕτως ὁ Παῦλος ἐξηλθεν ἐκ μέσου αὐτῶν.

Interlinear

Thus Paul went out from the midst of them.

FNV

So Small Man went on his way.



Acts 17:33



Greek

Οὕτως ὁ Παῦλος ἐξηλθεν ἐκ μέσου αὐτῶν.

Interlinear

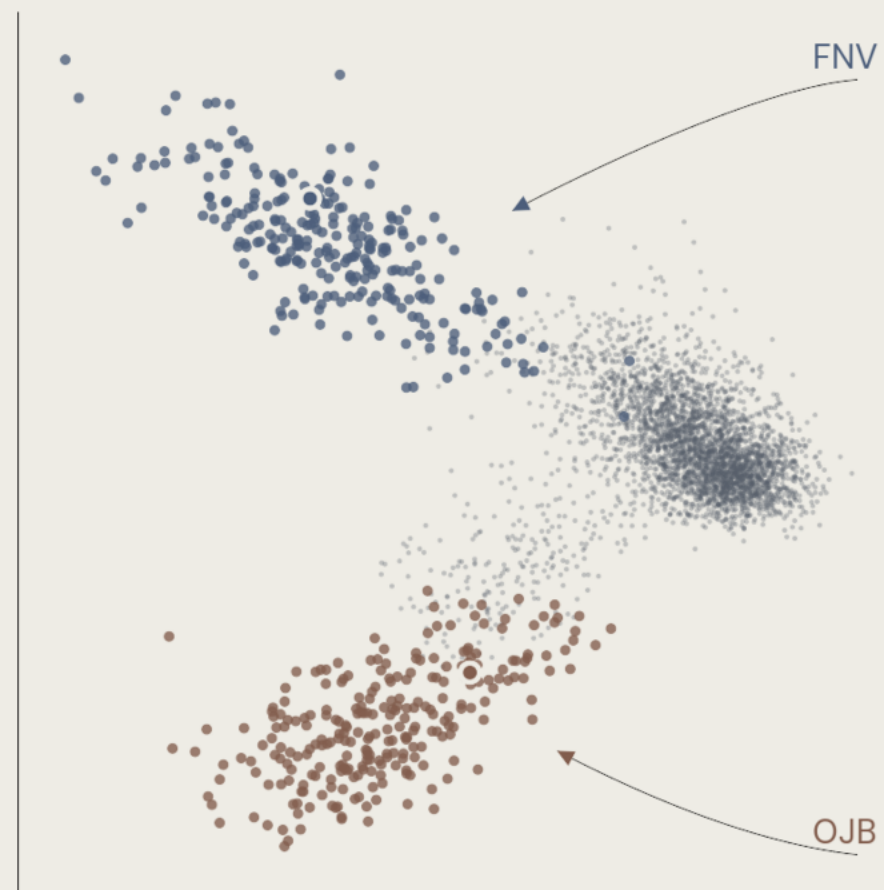
Thus Paul went out from the midst of them.

FNV

So Small Man went on his way.

OJB

Thus did Rav Sha'ul go out from the midst of them.



Next steps



Next steps



$4096d \rightarrow \text{PCA} \rightarrow 2d$

what else is encoded?

Next steps



4096d $\rightarrow$ PCA $\rightarrow$ 2d

what else is encoded?

classical text

source $\rightarrow$ interlinear $\rightarrow$ literary

contemporary text

texts without an interlinear
baseline

Intervention Vector



mrpacz.com/dh2026