The Effect of Translationese in Machine Translation Test Sets

WMT19, Florence, 2nd of August 2019

university of
groningen

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Overview

1. **What is translationese?**
2. **Translationese in MT data sets**
3. **Research Questions**
4. **Conclusions & Future work**

What is translationese?

Translationese

Translated text (*translationese*) $\neq$ original text

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- The differences do not indicate poor translation but rather a statistical phenomenon (Gellerstam, 1986)
- Simpler, more homogeneous, more explicit, interference from source language, aka translation universals (Baker, 1993)

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- **What about test data?**

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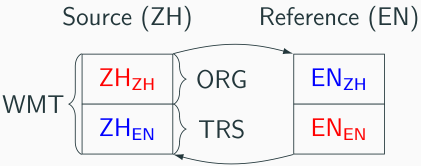

	Source (ZH)		Reference (EN)
WMT	ZH_{ZH}	ORG	EN_{ZH}
	ZH_{EN}	TRS	EN_{EN}

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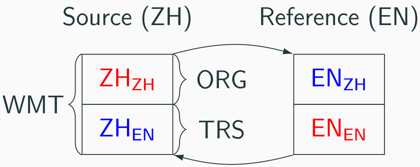

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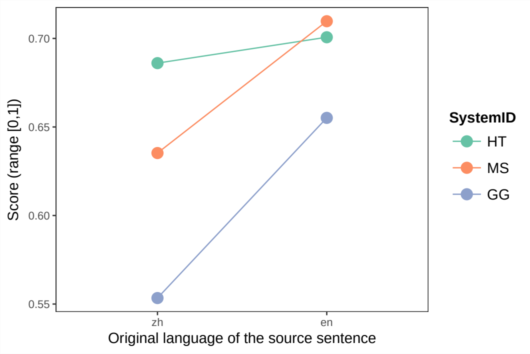

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- Läubli et al. (2018) in similar fashion, show stronger preference for human translations over MT when evaluating documents compared to isolated sentences, on Hassan et al. (2018)
- Taking the two works above, Graham et al. (2019) found evidence that translationese compared to original text can potentially negatively impact the accuracy of machine translation evaluations

Research Questions

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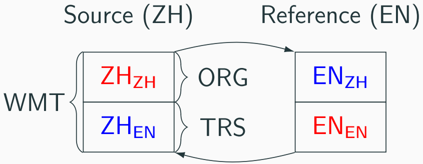
2. If the answer to RQ1 is yes, does this effect of translationese have an impact on WMT's system rankings?
3. If the answer to RQ1 is yes, would some language pairs be more affected than others?

This study

- **Dataset**: WMT16, WMT17, and WMT18 → 17 translation directions, 10 unique languages (Bojar et al., 2016, 2017, 2018).
- **Human evaluation**: Direct Assessment (DA), by bilingual crowd workers and participants (Graham et al., 2013, 2014, 2017).



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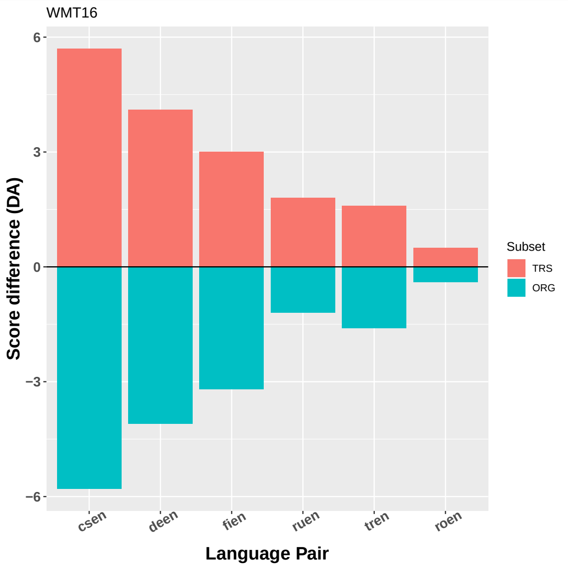
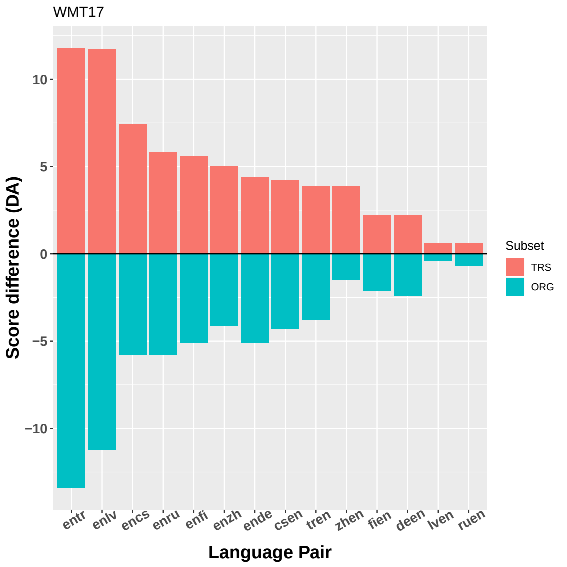
RQ1: Does Translationese Affect Human Evaluation Scores?

RQ1: favouritism for translationese, WMT16



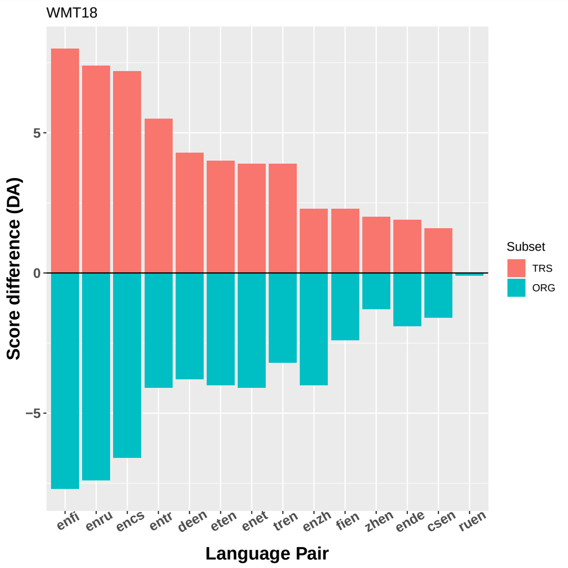
- Score difference in DA, ORG = original input, TRS = translationese input
- Consistent trend over all language pairs

WMT17



- Similar trend, TRS = inflation of scores, ORG = deflation of scores.

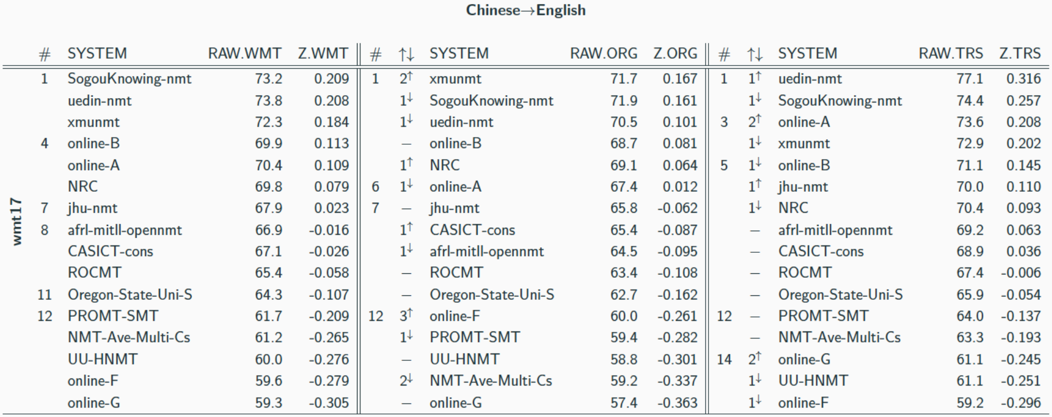
WMT18



- Again, same trend over all language pairs
- Does translationese unfairly favour MT systems?
- **Yes!**

RQ2: Do Systems' Rankings Change?

RQ2: impact on WMT’s system rankings? (e.g. ZH → EN)



Chinese→English

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wmt17	1	SogouKnowing-nmt	73.2	0.209	1	2↑	xmunmt	71.7	0.167	1	1↑	uedin-nmt	77.1	0.316
		uedin-nmt	73.8	0.208		1↓	SogouKnowing-nmt	71.9	0.161		1↓	SogouKnowing-nmt	74.4	0.257
		xmunmt	72.3	0.184		1↓	uedin-nmt	70.5	0.101	3	2↑	online-A	73.6	0.208
	4	online-B	69.9	0.113		—	online-B	68.7	0.081		1↓	xmunmt	72.9	0.202
		online-A	70.4	0.109		1↑	NRC	69.1	0.064	5	1↓	online-B	71.1	0.145
		NRC	69.8	0.079	6	1↓	online-A	67.4	0.012		1↑	jhu-nmt	70.0	0.110
	7	jhu-nmt	67.9	0.023	7	—	jhu-nmt	65.8	-0.062		1↓	NRC	70.4	0.093
	8	afrl-mitll-opennmt	66.9	-0.016		1↑	CASICT-cons	65.4	-0.087		—	afrl-mitll-opennmt	69.2	0.063
		CASICT-cons	67.1	-0.026		1↓	afrl-mitll-opennmt	64.5	-0.095		—	CASICT-cons	68.9	0.036
		ROCMT	65.4	-0.058		—	ROCMT	63.4	-0.108		—	ROCMT	67.4	-0.006
	11	Oregon-State-Uni-S	64.3	-0.107		—	Oregon-State-Uni-S	62.7	-0.162		—	Oregon-State-Uni-S	65.9	-0.054
	12	PROMT-SMT	61.7	-0.209	12	3↑	online-F	60.0	-0.261	12	—	PROMT-SMT	64.0	-0.137
		NMT-Ave-Multi-Cs	61.2	-0.265		1↓	PROMT-SMT	59.4	-0.282		—	NMT-Ave-Multi-Cs	63.3	-0.193
		UU-HNMT	60.0	-0.276		—	UU-HNMT	58.8	-0.301	14	2↑	online-G	61.1	-0.245
		online-F	59.6	-0.279		2↓	NMT-Ave-Multi-Cs	59.2	-0.337		1↓	UU-HNMT	61.1	-0.251
		online-G	59.3	-0.305		—	online-G	57.4	-0.363		1↓	online-F	59.2	-0.296

RQ2: impact on WMT's system rankings? (e.g. ZH → EN)

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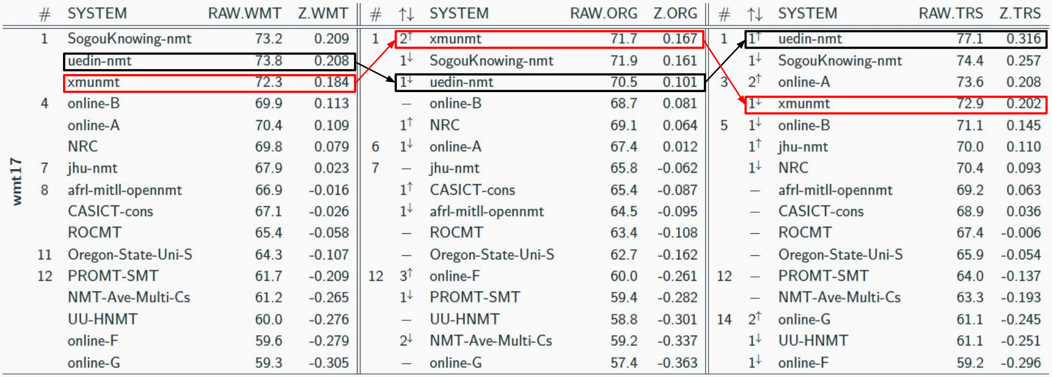

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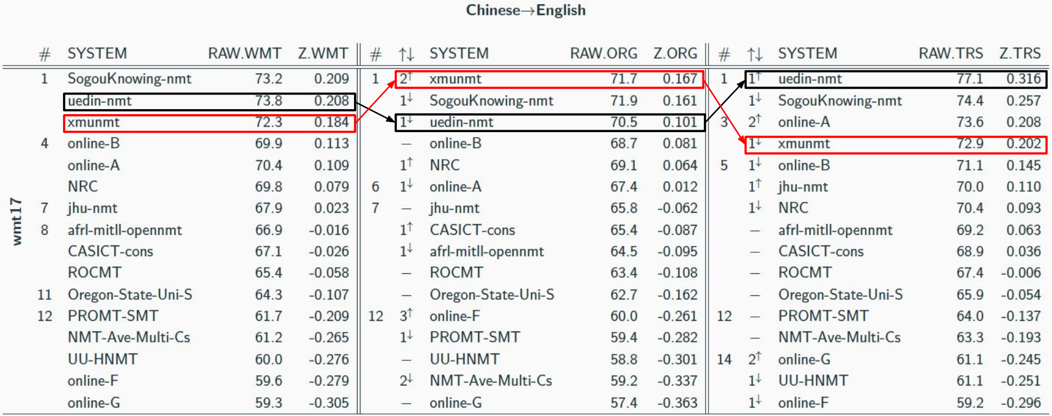

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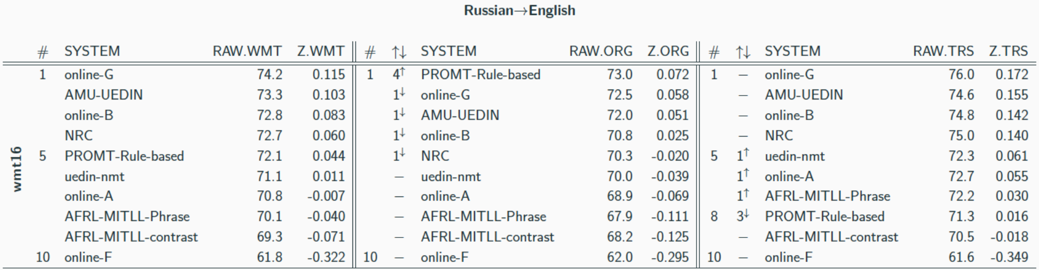
- Clusters change: WMT(1,4,7,8,11,12)→ORG(1,6,7,12)→TRS(1,3,5,12,14)

Another example (RU → EN)



Russian→English

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		AMU-UEDIN	73.3	0.103		1↓	online-G	72.5	0.058		–	AMU-UEDIN	74.6	0.155
		online-B	72.8	0.083		1↓	AMU-UEDIN	72.0	0.051		–	online-B	74.8	0.142
		NRC	72.7	0.060		1↓	online-B	70.8	0.025		–	NRC	75.0	0.140
	5	PROMT-Rule-based	72.1	0.044		1↓	NRC	70.3	-0.020	5	1↑	uedin-nmt	72.3	0.061
		uedin-nmt	71.1	0.011		–	uedin-nmt	70.0	-0.039		1↑	online-A	72.7	0.055
		online-A	70.8	-0.007		–	online-A	68.9	-0.069		1↑	AFRL-MITLL-Phrase	72.2	0.030
		AFRL-MITLL-Phrase	70.1	-0.040		–	AFRL-MITLL-Phrase	67.9	-0.111	8	3↓	PROMT-Rule-based	71.3	0.016
		AFRL-MITLL-contrast	69.3	-0.071		–	AFRL-MITLL-contrast	68.2	-0.125		–	AFRL-MITLL-contrast	70.5	-0.018
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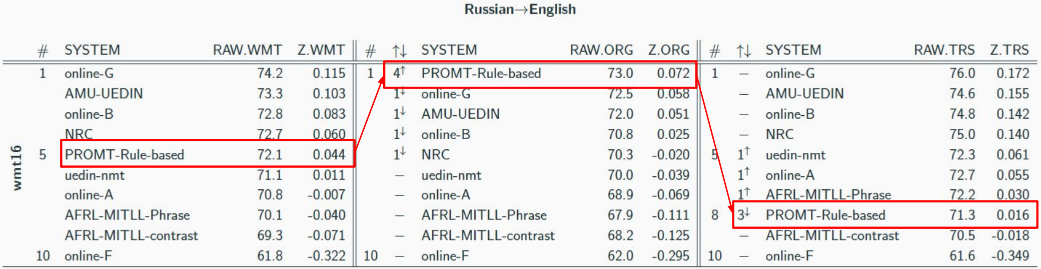

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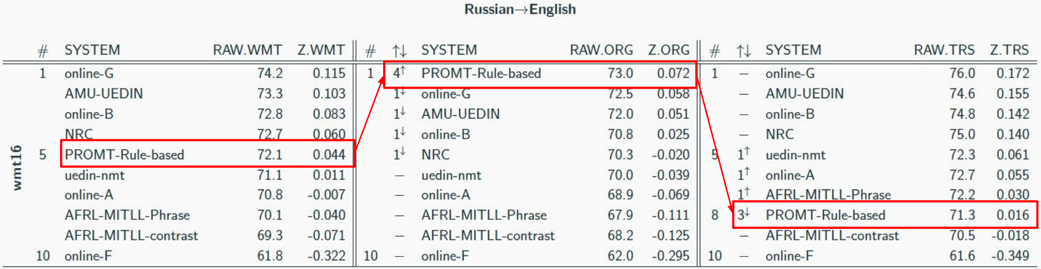

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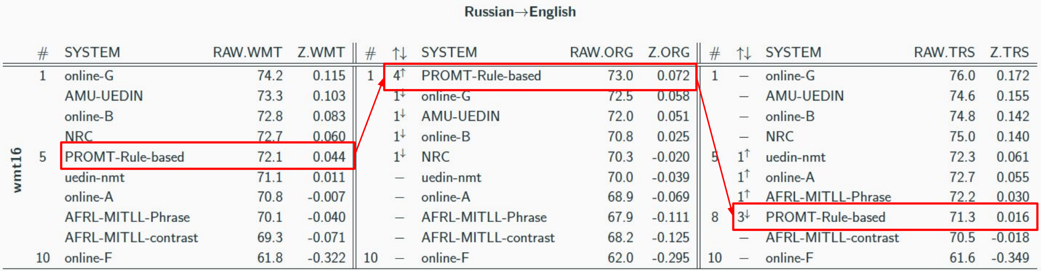

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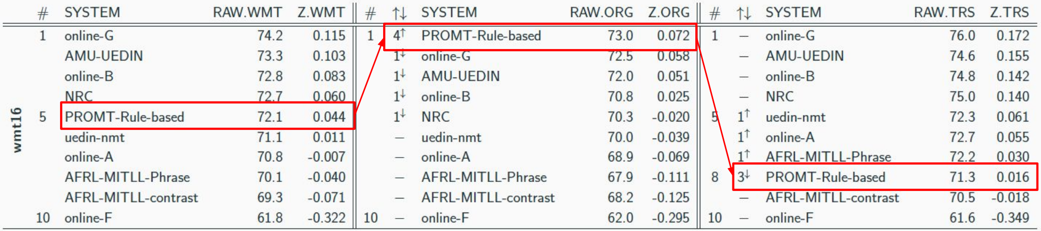
		NRC	72.7	0.060		$1^{\downarrow}$	online-B	70.8	0.025		–	NRC	75.0	0.140
	5	PROMT-Rule-based	72.1	0.044		$1^{\downarrow}$	NRC	70.3	-0.020	5	$1^{\uparrow}$	uedin-nmt	72.3	0.061
		uedin-nmt	71.1	0.011		–	uedin-nmt	70.0	-0.039		$1^{\uparrow}$	online-A	72.7	0.055
		online-A	70.8	-0.007		–	online-A	68.9	-0.069		$1^{\uparrow}$	AFRL-MITLL-Phrase	72.2	0.030
		AFRL-MITLL-Phrase	70.1	-0.040		–	AFRL-MITLL-Phrase	67.9	-0.111	8	$3^{\downarrow}$	PROMT-Rule-based	71.3	0.016
		AFRL-MITLL-contrast	69.3	-0.071		–	AFRL-MITLL-contrast	68.2	-0.125		–	AFRL-MITLL-contrast	70.5	-0.018
	10	online-F	61.8	-0.322	10	–	online-F	62.0	-0.295	10	–	online-F	61.6	-0.349

- Clusters change: WMT(1,5,10)→ORG(1,10)→TRS(1,5,8,10)
- So would there be ranking changes?

Another example (RU → EN)

Russian→English



	#	SYSTEM	RAW.WMT	Z.WMT	#	↑↓	SYSTEM	RAW.ORG	Z.ORG	#	↑↓	SYSTEM	RAW.TRS	Z.TRS
wmt16	1	online-G	74.2	0.115	1	4↑	PROMT-Rule-based	73.0	0.072	1	–	online-G	76.0	0.172
		AMU-UEDIN	73.3	0.103		1↓	online-G	72.5	0.058		–	AMU-UEDIN	74.6	0.155
		online-B	72.8	0.083		1↓	AMU-UEDIN	72.0	0.051		–	online-B	74.8	0.142
		NRC	72.7	0.060		1↓	online-B	70.8	0.025		–	NRC	75.0	0.140
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		AFRL-MITLL-Phrase	70.1	-0.040		–	AFRL-MITLL-Phrase	67.9	-0.111	8	3↓	PROMT-Rule-based	71.3	0.016
		AFRL-MITLL-contrast	69.3	-0.071		–	AFRL-MITLL-contrast	68.2	-0.125		–	AFRL-MITLL-contrast	70.5	-0.018
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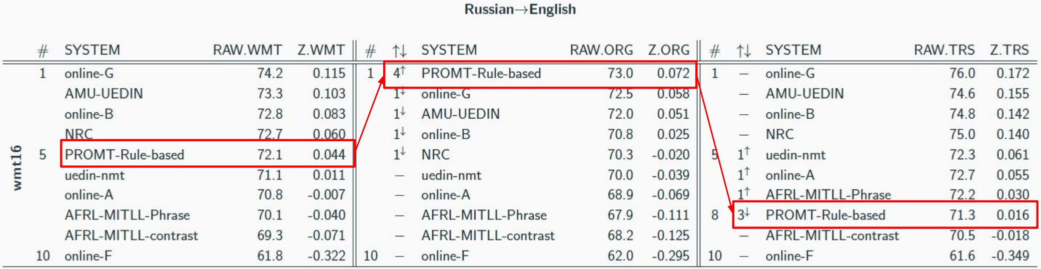

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	#	SYSTEM	RAW.WMT	Z.WMT	#	↑↓	SYSTEM	RAW.ORG	Z.ORG	#	↑↓	SYSTEM	RAW.TRS	Z.TRS
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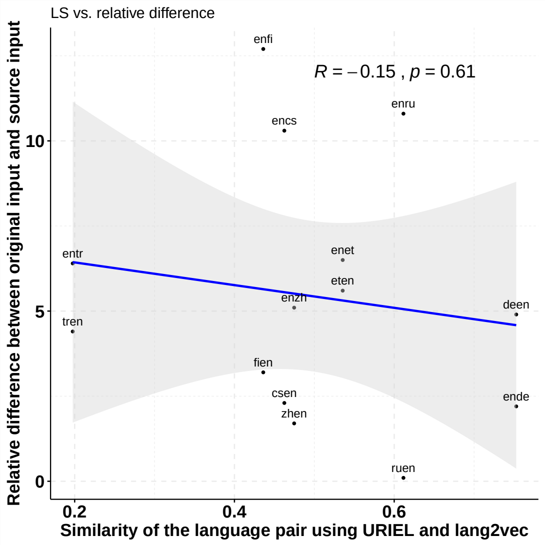
- So would there be ranking changes?
- **Yes, and clusters too!**
- However, half data

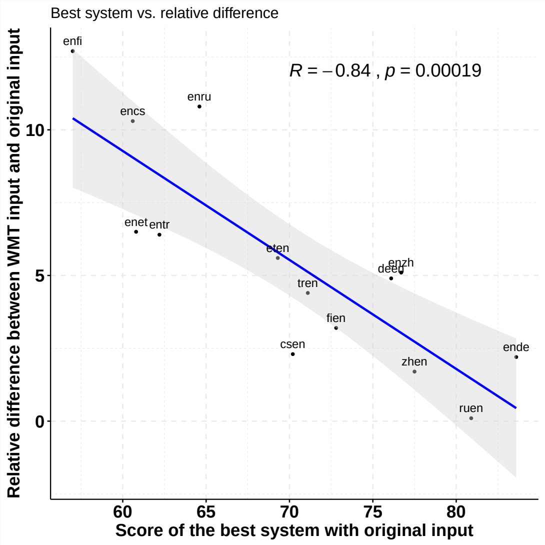
RQ3: Are Some Languages More Affected?

Research Question 3: is there a trend?



- Language similarity (lang2vec (Littell et al., 2017)) vs. relative difference between WMT input and ORG input
- Low correlation

Research Question 3: is there a trend?



- Highest scoring system (with only ORG input) vs. relative difference between WMT input and ORG input
- High correlation!
- High differences could be due to under-resourced languages

Conclusions & Future work

Conclusion

- **Translationese**: if present, it inflates DA scores. If removed, it lowers DA scores.

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- **Future work**: characteristics of translationese in the WMT test sets.

Ack. WMT: for providing the data

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Thank you!

Questions?

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	With Ties			Mean		Without Ties			
Language Direction	WMT16	WMT17	WMT18			WMT16	WMT17	WMT18	Language Direction
Romanian → English†	1.000*	-	-	1.000	1.000	1.000*	-	-	Romanian → English †
Turkish → English	0.983*	0.948*	1.000*	0.977	1.000	1.000*	1.000*	1.000*	Czech → English
Finnish → English	0.943*	0.966*	1.000*	0.970	0.978	-	-	0.978*	English → Estonian †
Czech → English	0.929*	1.000*	0.949*	0.959	0.956	-	-	0.956*	Estonian → English †
German → English	0.979*	0.939*	0.906*	0.941	0.944	-	0.944*	-	Latvian → English †
English → Czech	-	0.904*	0.949*	0.927	0.929	-	0.929*	0.929*	English → Turkish
Latvian → English†	-	0.921*	-	0.921	0.917	-	0.889*	0.944*	English → Russian
English → Finnish	-	0.868*	0.968*	0.918	0.898	-	0.927*	0.868*	English → Chinese
English → Russian	-	0.873*	0.935*	0.904	0.882	-	0.882*	-	English → Latvian †
Chinese → English	-	0.923*	0.882*	0.903	0.869	0.733*	0.944*	0.929*	Russian → English
English → German	-	0.863*	0.856*	0.860	0.852	1.000*	1.000*	0.556*	Finnish → English
English → Estonian†	-	-	0.845*	0.845	0.848	0.833*	0.911*	0.800*	Turkish → English
Estonian → English†	-	-	0.830*	0.830	0.784	-	0.633*	0.934*	Chinese → English
English → Chinese	-	0.847*	0.789*	0.818	0.726	-	0.451*	1.000*	English → Czech
English → Turkish	-	0.890*	0.734*	0.812	0.713	0.911*	0.345	0.883*	German → English
Russian → English	0.557	0.845*	0.890*	0.764	0.675	-	0.817*	0.533*	English → German
English → Latvian †	-	0.718*	-	0.718	0.637	-	0.970*	0.303	English → Finnish