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TRANSLATION AND ANCHORING BIAS: A STUDY OF EQUIVALENCE IN ENGLISH-POLISH STUDENT TRANSLATION TASKS

ABSTRACT

The study looked at 94 re-translations of the same source text in order to investigate anchoring effects in translation decisions. The analysis focused on two two-level explanatory variables corresponding to binomial grammatico-syntactic choices and tested anchoring effects against the proposed equivalence measure (length production metric related to object range estimate in context). The anchoring effect was observed in 0.7 of re-translations for both explanatory variables. When tested for statistical significance of the equivalence measure, the anchoring group contained versions whose length-to-words ratio was higher when the original anchor was an unidiomatic verb phrase, and versions whose length-to-words ratio was lower when the original anchor was idiomatic syntax corresponding to human-scale conceptualization of a tourist visit scenario (although the results were up to two per cent short of the statistical significance threshold for both tests).

Keywords: translation equivalence metrics, anchoring bias, re-translation corpora

ABSTRAKT

TŁUMACZENIE A EFEKT ZAKOTWICZENIA. BADANIE EKWIWALENCJI W ANGIELSKO-POLSKICH TŁUMACZENIACH DOKONANYCH PRZEZ STUDENTÓW FILOLOGII ANGIELSKIEJ

W badaniu przeanalizowano 94 tłumaczenia tego samego tekstu i dokonano obserwacji efektu zakotwiczenia w decyzjach tłumaczeniowych. Analiza skupiła się na dwuwartościowych decyzjach tłumaczeniowych, odpowiadających opcjom gramatyczno-syntaktycznym, które przetestowano w oparciu o zaproponowany metakognitywny miernik ekwiwalencji (pomiar długości względem szacunkowej liczby obiektów w wypo-

wiedzeniu). Efekt zakotwiczenia zaobserwowano w 70 procentach tłumaczeń zarówno dla pierwszej jak i drugiej zmiennej objaśniającej. W badaniu istotności statystycznej średni iloraz długości i liczby słów w zdaniach był większy dla grupy z efektem zakotwiczenia, kiedy zakotwiczenie opierało się na nieidiomatycznym orzeczeniu oraz mniejszy, gdy zakotwiczenie opierało się na naturalnej konceptualizacji scenariusza zwiedzania (rezultaty obu testów blisko progu istotności statystycznej).

Słowa kluczowe: pomiar ekwiwalencji w tłumaczeniu, zakotwiczenie, korpusy tłumaczeń

1. Introduction

The problem of anchoring bias, defined in seminal works by Kahneman and Tversky[1], and more recently researched as "everyday varieties" of anchoring[2], has become an important discussion point for translation studies. One recent argument predicts that machine translation will hamper translation output in the long term. The reasoning here is that the psycholinguistic reality of anchoring bias, whereby the first prompt may delimit the scope of possibilities in translation problem-solving, would erode translation quality even in traditionally "creative" literary translation[3]. Reliance on machine translation will lead to "disuse atrophy"[4], posing a danger for translator output or quality assurance, and by extension, to the robustness of a literary culture. The new predictions turn the spotlight on translation as transfer, translators operating at the interface between the conceptualization of the source text and the conceptualization to be offered to a new community, linking the notion of transfer with the problem of anchoring bias.

The attitudes and persuasion perspective on anchoring bias[5] may be linked to the linguistics-based notion of transfer, or more broadly to the phenomenon of translationality[6], and in specific cases it may be discussed in terms of directionality

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1 A. Tversky, D. Kahneman, *Judgment under uncertainty: heuristics and biases*, "Science" 1974, p. 185.

2 N. Epley, T. Gilovich, *Anchoring unbound*, "Journal of Consumer Psychology" 2010, 20 (1), p. 23.

3 *Association pour la promotion de la traduction literaire* cited in: A. Pym, Y. Hao, *How to augment language skills. Generative AI and machine translation in language learning and translator training*, Abingdon-on-Thames 2025, p. 154.

4 Ibidem, p. 164.

5 N. Epley, T. Gilovich, *Anchoring unbound…*, pp. 20–24.

6 P. Blumczynski, *Experiencing translationality: material and metaphorical journeys*, Abingdon-on-Thames 2023.

reflecting power relations between languages[7]. Consequently, grammaticalizations and generalized conceptualizations[8] observed in translation data may be researched for evidence pointing to shifts, where observational count data on conceptualizations or grammaticalizations in re-translated texts may be held to model statistically transfer and anchoring effects.

Further, existing re-translations allow for a retrieval of continuous variable data that model message equivalence without necessarily modelling lexical correspondence between versions because re-translated versions may be hypothesized to be equivalent so far as that they were produced in the same translation environment, based on the same brief. This approach to data is consistent with the linguistics-derived equivalence paradigm where the notion of equivalence "assumes that, on some level, a source text and a translation can share the same value (...), and that this assumed sameness is what distinguishes translations from all other kinds of texts"[9]. Non-semantic meta-cognitive measures of information volume, as proper to *parole,* not *langue*[10], may be derived from re-translation sets on the assumption that they represent the same semantic entity (message) in many measurement-actuations.

2. Method

The notion of translation equivalence models not only the translation relationship between the source text and the target text, but also the relationship between different re-translations[11]. This opens the way for quantitative investigations of translation samples presented as equivalent by different individuals. In a single language, equivalent messages would fall within a statistically probable range of values when operationalized as a meta-cognitive measure of equivalence relating message production length (number of characters with spaces) to message density (number of word-gestalts). Putatively equivalent messages (produced in the same

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7 Cf. T.K. Lee, *Translation and translanguaging in (post)multilingual societies*, [in:] *The Cambridge handbook of* translation, Cambridge 2022, p. 122, for models of power relations between languages in the context of translation and translanguaging.

8 R. Langacker, *The cognitive grammar*, Oxford 2008.

9 A. Pym, *Explaining translation theories*, Abingdon-on-Thames 2010, p. 6.

10 Cf. W. Koller, *Einführung in die Übersetzungswissenschaft*, Heidelberg 1979, explaining the distinction between *Aeqvivalenz* and *Korrespondenz* in translation studies.

11 Cf. R. Jakobson, *On linguistic aspects of translation*, [in:] *The translation studies reader*, L. Venuti (ed.), Abingdon-on-Thames 2000 [1959], pp. 113–118.

translation tasks by different subjects) may differ structurally and may be expected to have varying length, but the number of objects they refer to should be held as stable in human-made re-translations of the same source. The number of words in a human-translated sentence forming part of a contextualized message may be accepted as an estimate of object range within this sentence-conceptualization, including a human error margin.

Such a model provides a basis for disqualifying candidate messages based on formal, statistical criteria. They are derivable from classic theory of linguistic pragmatics – Paul Grice's maxim of quantity[12]. When we compute the character-to-word-count ratio for every candidate message in a set of observed re-translations, this ratio should not be significantly different from the mean. Outliers can be excluded from the set on account of linguistic implicature alone, message length being interpreted as meaningful. This reasoning allows us to test – rather than just accept – re-translation candidate samples as equivalent, hypothesizing that a set of ratios from re-translations in the same language would be normally distributed.

Consequently, this study proposes a meta-cognitive measure of equivalence to be computed for all observed re-translated versions. In this measure, equivalence is operationalized as the ratio of characters with spaces to the number of words in the observed sentence. The assumption made is that, based on the maxim of quantity, the equivalence measure for the set of observed re-translations should be normally distributed, because the number of objects that the source text makes reference to is the same for each translating subject. Consequently, the equivalence measure can be tested for statistical relationships relative to categorical variables observed in terms of cognitive grammar and semantics, leading to statements about observed meaning structures (rather than merely language structures), and linking the patterns of meaning structures to related notions – including anchoring bias.

3. Data

The data for this study come from translation exercises delivered over four years of undergraduate translation training (*filologia angielska*, year 2). The set under examination comprises 94 translations delivered independently in class and

[12] P. Grice, *Logic and conversation*, [in:] *Syntax & semantics*, P. Cole, J.L. Morgan (eds.), Cambridge, MA 1975.

finished at home by 94 subjects translating from a dominating language (English) to a dominated language (Polish). The brief specified that the translation should be usable for tourists and that the translator could edit the text to make the reading experience relevant for tourists. Since the brief was oral rather than read, and the introduction was preceded by feedback on previous class assignments on trediting (translating and editing for the web, context of news translation[13]), the translation task would not qualify as a controlled experiment. The data might reflect different effects such as group consultation, information sharing etc. But since the translations were finished at home, uploaded a few days later, they count as individual work.

Thus, the textual evidence in the study contains (a) a Greek text for tourists published by the Municipality of Rhodes on its official website as well as its translations into two languages: (b) the English translation of the source text – 1 sample containing the English translation that was published on the same website – and (c) 94 Polish translations based on the English text delivered by 94 Polish-speaking students of English.

Both (b) the English translation and (c) the Polish translations were interpreted in light of electronic maps and photographs available to 94 subjects delivering (c) Polish translations (web and other sources). The Greek and the English versions were retrieved from the website of the Municipality of Rhodes in 2021; the translations from English were delivered in 2021, 2022, 2023, and 2024.

The students could access the authentic website of Rhodos, browsing the Greek and English version, so they cannot be assumed to have ignored that they were dealing with a re-translation. Yet, no student reported any acquaintance with Greek at the time of writing. Other data in the translation task suggest that students did not use machine translation to deliver their versions[14].

The conceptual structure of the sentence to be analyzed using quantitative methods needs to be explained in context.

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13 As defined by: L. Davier, *Translating news*, [in:] *The Cambridge handbook of translation*, K. Malmkjaer (ed.), pp. 401–420.

14 The English version also contained the information that the Palace was built "below the acropolis of ancient Rhodes". This posed difficulty, and student versions struggled to locate the palace on a slope assumed by "below/above". The difficulty resulted from a mistranslation: the Greek source mentioned the lower acropolis ([…]η θέση της κάτω Ακρόπολης της αρχαίας Ρόδου), an answer that could be obtained if one copy-and-pasted the Greek source into popular machine translation services (e.g. DeepL). Student versions omitted or obscured the issue; consequently, they may be assumed to have followed the brief asking for a human translation throughout.

Table 1. Context sentence (Greek source, English translation)

Greek source	Ανηφορίζοντας την οδό Ιπποτών στο τέρμα δεξιά, βρίσκεται το παλάτι του Μεγάλου Μαγίστρου.
Gloss translation	[going up] [the street of the Knights] [on the right] [there is] [the palace] [of the Great Master]
English version	Walking up the street of the Knights, at the top and to the right is the Grand Master's Palace.

Source: www.rhodes.gr/museum/?lang=en [accessed 30.04.2021].

The first verb used in the Greek version (1) is the medio-passive form of the verb *βρίσκομαι* ('can be found', 'is to be found'), conceptualizing the palace as the subject of the sentence. The following sentence will pick up from the narrative, and importantly for the conceptual analysis to follow, it will avoid medio-passive structures (possibly to diversify stylistic resources).

Table 2. Studied sentence (Greek source, English translation)

Greek source	Απέναντι από το παλάτι και ανάμεσα σε λείψανα διαφόρων ιστορικών περιόδων, μπορεί κανείς να ξεχωρίσει και τα ερείπια της καθολικής εκκλησίας του Αγίου Ιωάννου.
Gloss translation	[opposite the palace] [and among the remnants of various historical periods] [one can discern] [also the ruins of the Catholic church of Saint John]
English version	Opposite the palace amongst the ruins from different historical periods, one can determine the ruins of the Catholic Church of St. John.

Source: www.rhodes.gr/museum/?lang=en [accessed 30.04.2021].

The second studied sentence contains (2) the verb *ξεχωρίζω* (prototypically: 'set apart', and by extension 'perceive', 'distinguish', or 'stand out' when used intransitively). The latter verb is introduced with the indefinite pronoun *κανείς*, conceptualizing the ruins as an object that 'one' (for people in general) can see.

This phrase is an important element in the analyzed data: the English text proposes *one can determine* as the equivalent of *μπορεί κανείς να ξεχωρίσει*. This choice may be deemed infelicitous in light of the British National Corpus, which returns 8 hits for the query *one can determine*, all of them in academic or technical contexts, and (when followed by an object) pertaining to scientific and scholarly concepts, such as measures (e.g. *amount of time*, *the lowest possible mass*), abstract features (*commonalities among the terms*) or graphically representable mathematical

models (*trajectory of a missile)*. The phrase *one can determine* is recorded in reference to mental operations that are largely conscious, theoretical or technical (scientific and scholarly reason, including modelling, rather than spontaneous thought). Consequently, the translation *from amongst ruins one can determine the ruins* qualifies as translationese, and the faultiness of the English source becomes salient if one considers the purpose of the translation task (the conceptual scenario of VISITING A TOURIST SITE rather than STUDYING SCIENTIFICALLY AN OBJECT).

The Greek text describes the topography of the old town in Rhodes, Greece, focusing on the Palace of the Grand Master and situating the landmark monument at an elevation (the popular way to the high ground leads through an uphill lane known as Knights' Street). The second sentence draws the attention of the reader to the remnants of a Catholic church, which once stood opposite the palace. As such, the text introduces a landmark (sentence one) and situates another site opposite the landmark (sentence two). It is accurate to talk about a site rather than the ruins of a construction, so far as that the remains of the Catholic church are mostly stone base elements, or stone slabs reposing on the ground – as visible in Google Street View photographs that students could access. The ruins would be conceptualized as a container-space rather than a plane-figure, marked out from surrounding three-dimensional historic development (corresponding to Greek *ανάμεσα σε…*). As such, the ruins may be experienced from within or without, perceived among other perceptible objects, emerging from the background gradually or immediately grasped – depending on the assumed visual frame emerging from the study of maps, photographs and, of course, the English version.

Observations on re-translation samples included (a) the ratio of characters with spaces to words (equivalence measure); (b) thematic roles of ruins, and (c) the syntactic order of the sentence.

The equivalence ratio (a) was computed for each re-translation sample based on the observed number of characters with spaces divided by the number of words. A set of 94 measurement values was obtained.

The thematic roles of ruins (b) were observed by assigning the observed conceptualization to one of two groups: sentences that conceptualized the ruins as a patient and sentences that conceptualized the ruins as an agent. Patient-type conceptualizations included sentences with finite and defective perception verbs followed by the verb complement corresponding to English *ruins* (*można znaleźć*, *widać*, *zobaczymy* etc.). Agent-type conceptualizations included versions in which the ruins served as the subject of a sentence followed by a finite, simple or medio-passive (reflective) verb form (*znajdują się*, *wyłaniają się*, *przyciągają wzrok*).

The roles were marked on the assumption that they reflect translator intervention in the experimental frame. In this frame, the source language conceptualization

(spatial relations between the palace, the ruins of the church, and the historic development around the location) is typical, but the phrasing is unnatural if heeded to (conceptualizing everyday visual perception as a cognitively conscious, deliberative act). In translation delivery, one could gloss over the jarring phrasing and retain the assumed conceptualization; or one could propose a different conceptualization, possibly as a reaction to the dissonance.

The syntactic order of re-translated sentences (c) was observed by assigning the sentences to two categories: sentences that reproduce the original order: Adverbial of place (composite) + subject + verb + verb complement; and other sentences. This observation was made on the assumption that a change to syntactically expressed information flow in the sentence would be a mark of translator intervention.

One important category that the analysis ignored was language mistakes. Student re-translations, on the whole, were deficient in terms of spelling, style and grammar, and errors observed deserve a study of their own, including the problems caused by the phrase *one can determine* in some versions. In this study, errors – important as they are – are seen as a function of language form. The translation task under investigation involved no restrictive time limit and, consequently, erroneous choices, including those that students sensed but could not eliminate, would result in workarounds, accrued elements, and, consequently, inflated characters-to-words ratio. Since, for brevity, the study only focused on selected categories, errors were not treated separately.

4. Results

The set of 94 computed equivalence measures (characters with spaces divided by the number of words) was tested for normality. The Shapiro-Wilk normality test returned the p-value = 0.4463 (W = 0.98644), justifying the treatment of the set as normally distributed.

4.1. Original vs Alternative thematic roles

The equivalence measure samples were categorized as containing agent-type (alternative) or patient-type (original) conceptualizations of the landmark, giving 28 and 66 observations, respectively (Shapiro test W = 0.96969, p-value = 0.5724 and W = 0.9862, p-value = 0.6761, respectively)[15].

[15] This included incidental faulty translations: e.g. one version contained the original information flow, but replaced the reference to landmark ruins with a reference to the palace. Since the

The variances for the two groups were 0.2019063 for the Agent-type and 0.2621247 for the Patient-type. The Fisher test was conducted to compare variances in ratios for patient-type and agent-type samples, showing no statistically significant difference between variances (F = 0.77027, num df = 27, denom df = 65, p-value = 0.4583). Variances not being significantly different, the Student t test was carried out to compare means of the two subsets. The length-to-words ratio mean was higher for Patient-type sentences, but the t statistic fell narrowly within the confidence interval (t = -1.851, df = 57.666, p-value = 0.0693).

4.2. Original vs Alternative sentence structure

There were 66 observations of the original sentence structure (equivalence measure Shapiro test W = 0.99233, p-value = 0.9583) and 28 observations of other structures (equivalence measure Shapiro test W = 0.95139, p-value = 0.2146). Equivalence metric variance for the original structure group was 0.1835543 and 0.3953708 for the remaining structures group. These variances were statistically different (F = 0.46426, num df = 65, denom df = 27, p-value = 0.01231), so the Wilcoxon rank sums test with continuity correction was carried out. The difference between group means was not statistically significant (W = 1095, p-value = 0.1585).

Thematic roles cross-checked for sentence construction gave 7 observations of Agent-type Alternative-order samples, 21 observations of Agent-type Original-order observations, 21 observations of Patient-type Alternative-order samples and 45 observations of Patient-type Original-order samples.

Table 3. Thematic roles and sentence construction: testing independence of two variables

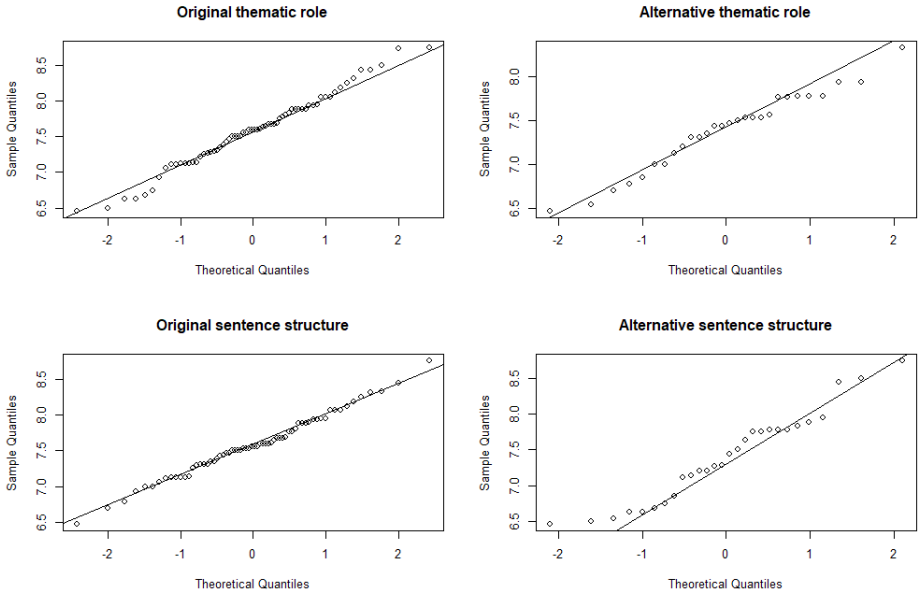
	Alternative structure	Original structure
Agent-type	7	21
Patient-type	21	45

Source: count data retrieved from the experimental set.

Pearson's Chi-squared test of independence of data presented in this contingency table does not point to any non-random effects (X-squared = 0.17178, df = 1, p-value = 0.6785).

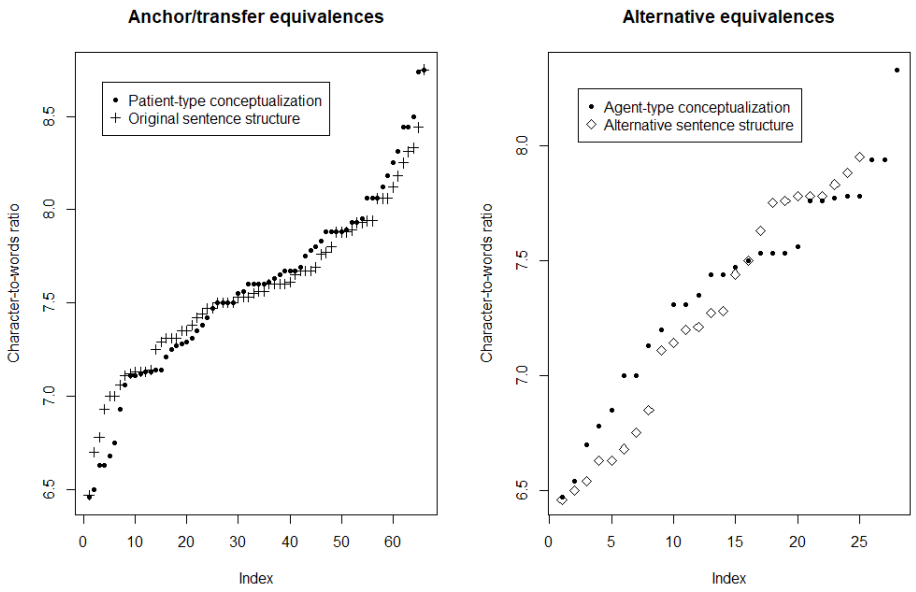
observation checked patient-agent conceptualization distribution, such errors were not the basis for an exclusion from the equivalent set. The problem of classification of candidate translations relative to errors will re-emerge in the discussion.

Figure 1. Theoretical quantiles of observed characters-to-words ratio by different groups



Source: graphic representation of the data under discussion generated using R 4.3.1 software.

Figure 2. Equivalence metric (sorted) by explanatory variables



Source: graphic representation of the data under discussion generated using R 4.3.1 software.

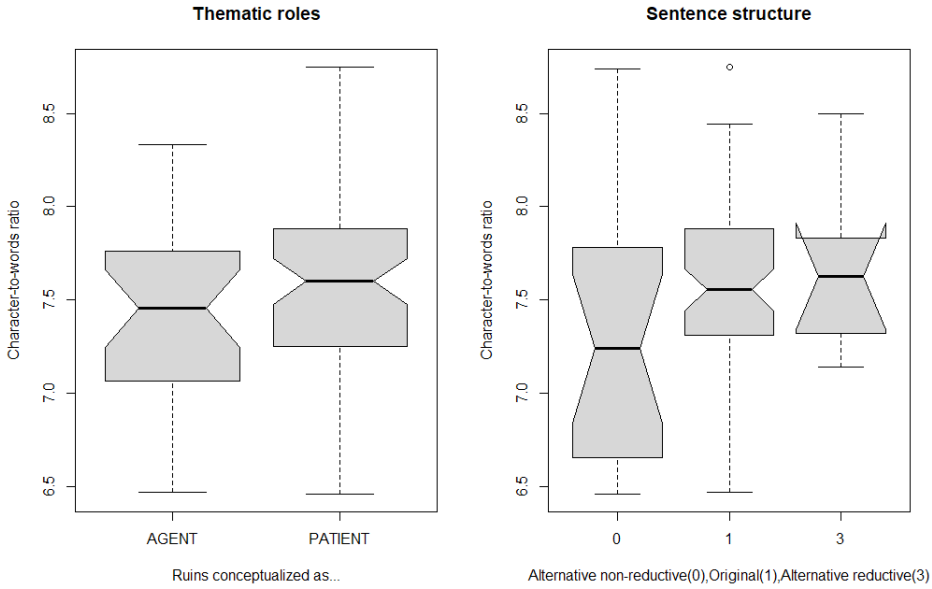
5. Discussion

In the investigated translation task students were given a source text that was not idiomatic. It contained a negative conceptual anchor, and students had to decide what to do with it: they could import the faulty conceptualization finding a grammaticalization for it; they could correct it, presuming it "assumed" different word forms; or they could reverse-correct the text, changing not just the grammaticalization but also the underlying conceptualization. A correction would involve interpreting the offending phrase *one can determine* as, in reality, *one can see*. A reverse correction might involve other options, which, when grammaticalized in Polish, could involve re-conceptualizing the ruins as the agent (rather than the patient). About thirty per cent of students picked the latter option and the equivalence metric for their group was two per cent off the confidence threshold for statistical significance ($\alpha = 0.05$, p-value = 0.0693).

The difference in equivalence metric means for two groups of thematic roles may be interpreted as evidence of writer workarounds, following the initial anchor-conditioned decision to replicate the pivot conceptualization. But considering that the source text was not idiomatic, it is possible to come up with a valence-centred interpretation: decisions could be made in response to the initial negative cognitive anchor of "bad English" (assuming that students, indeed, can be held to have perceived the anchor as negative). The two interpretations depend on the directionality of anchoring forces, but they illustrate the same reality: the two groups were not randomly ($p = 0.5$) distributed in the studied data, a result that is only to be expected for translation (transfer).

The other studied variable – sentence structure – points to the same reality of transfer, except this time no valence effect could be hypothesized. When read into human-scale conceptualizations of the tourist site in question, the original, syntactically-coded information flow was optimum for a visit scenario that involved reaching the landmark and taking note of the view south towards another landmark. No writing workarounds would be needed if one merely picked up the cue, replicating the information flow, because the information flow is structured as containing integral human-scale conceptualizations, rather than abstract or additional information, or afterthoughts (evident in the longest re-translation samples).

Figure 3. Illustration of equivalence metric distributions by (all) explanatory variable levels



Source: graphic representation of the data under discussion generated using R 4.3.1 software.

But what can be made of the results of the statistical tests? The assignment of re-translation samples to the Original and the Alternative sentence structure groups ignored the direction of modifications, bundling together sentences that were more complex, or convoluted, and translations that dropped the element corresponding to the adverbial of place situating ruins ("amongst the ruins from different historical periods"). These sentences could be assigned to an additional sub-category, corresponding to the third level of the categorical variable, or reductive Alternative structures, containing 7 observations. If we test sentence structure only on non-reductive equivalence, the Original-structure (66 observations) and the non-reductive Alternative structure group (28–7 = 21 observations) perform differently in testing compared to the previous test. Both groups pass the Shapiro test, but their variances are significantly different (p-value = 0.007338). Consequently, Wilcoxon rank sum test, assessing the probability that the groups should have equal means, returns the p-value of 0.05457 (W = 848.5), one half of one per cent off the significance threshold. Similar closure is in reach for Thematic roles if samples are trimmed based on errors made by the students, some of which may allow the disqualification of sentences from an equivalent set based on criteria

other than length. These results suggest that the criterion of equivalence adopted in this study needs further elaboration.

Finally, as noted earlier, the Chi-square test on the observed counts of two categorical explanatory variables with two levels each showed no interaction between Thematic roles and two-level Sentence structure (although both Thematic roles and Sentence structures could be seen as distributed based on anchoring/transfer phenomena). Specifically, in Sentence structures, as we have just observed, the original information flow would appear to lead to more economical versions. And yet, thirty per cent of student translators went along with alternative syntax solutions. As a result, both explanatory variables, one containing a putative negative anchor prompt, and one containing a putative positive anchor prompt, were split into groups at 0.7 (exact match: 66/94 for anchor/transfer group and 28/94 for alternative group for both independent variables). The replicate proportion (transfer/anchor effect) was the same for anchor elements that seem to have different valence (negative for thematic roles and positive for sentence structure).

Based on the tests above, it may be hypothesized that we see two effects in the data: reduced problem accrual and related workaround effort if you reverse-correct a conceptually burdening anchor on the one hand; increased production volume if you non-reductively re-structure human-scale anchor information flow on the other. Such results would not be counterintuitive for translation practitioners. Were they to be confirmed in other studies, they might constitute interesting information for Large Language Models use in translation practice.

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