

Contrasting post-editing and human translation along the dimension of term and cognate variation

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1. Introduction

Post-editing is a rather recent mode of translation production. In the most basic definition, post-editing is the correction of machine translation output, but some definitions include aspects such as quality criteria or the fact that post-editors should be trained translators (see e.g. O'Brien 2011).

Post-editing has been studied from various angles, mainly with respect to the questions of efficiency or quality. In some cases, the process of post-editing has been contrasted to the process of human translation (see O'Brien et al. 2014 for a collection of studies). While differences have been shown to exist between the two processes, e.g. on the level of macro processes (see e.g. Carl et al. 2011), little is known about how the post-edited products differ from human translation (with first insight provided e.g. in Lapshinova-Koltunski 2013; Lapshinova-Koltunski 2015) and which effects this might have on communication.

In this talk, I will first contrast post-editing and human translation along the dimension of term translation within the domain of Languages for Specific Purposes. In the study presented, terminological variation in translations from English into German was measured for both modes of translation. The findings reveal levels of variation on the terminological level in the post-edited texts close, but not identical, to those of the machine translation outcomes. They thus indicate a shining through of the machine translations in the post-editing products, motivating further research into the properties of post-edited texts within corpus-based translation studies. Also, I will present a brief pilot study on how cognates are used differently in machine and human translations: While the machine translation system used was heavily using cognates, in human translation (motivated) variation in the (non-)use of cognates could be observed.

Of course, both findings are very much dependent on the characteristics of the machine translation used. However, the point here is not to make generalizable statements on lexical properties of machine translated texts, but to identify dimensions along which human translations, post-edits and machine translations may differ and may be contrasted. On the basis of these findings, I will discuss in what way machine translation can have an impact on the product of translation and whether it might become a driving force for language change.

2. Evaluation

2.1. Data collection

The evaluation presented here is based on a general-purpose collection of translation and post-editing data including key logs and eye-tracking protocols recorded with Translog-II¹. In the experiment sessions, advanced students of translation were asked to lightly post-edit, fully post-edited and translate from scratch text snippets from a dish washer manual (12 students) and a medical leaflet (9 students). The order of tasks was permuted so that each text snippet was translated 4 resp. 3 times in each mode. All texts were about 150 words long. The texts were automatically pre-translated by Google Translate for the PE tasks. Students were given instruction for the post-editing; part of the instructions for the full post-editing as opposed to light post-editing was that they were specifically asked to ensure terminological consistency.

2.2. Evaluation

For the evaluation of term variation, we marked nominal terms in the English original texts which appeared at least 3 times in the text snippet. Nominal lexemes which were too general, such as *item* or *disease*, were ruled out as terms on an intuitive basis. For each term, we checked which variants (if any) were used in translation. This was mapped onto event types, with the most frequent translation as the preferred translation type, the second most frequent as the synonym 1 translation type etc.

Using this mapping, we were able to calculate translation probabilities and on top of this perplexity values for each translation type. A statistical analysis of perplexity values for terms in the machine translated and fully post-edited texts shows patterns of (non-)variation for machine translation and full post-editing very similar of

¹ <https://sites.google.com/site/centretranslationinnovation/translog-ii>

each other, but very different for human translation (Čulo and Nitzke 2016). In other words, on the terminological level, there is a *shining through* (Teich 2003) of lexical patterns from machine translation to post-edited texts in our data set.

Session	term translation	term frequency	event type
P21_FPE	Geschirrspülmaschine	4	pref.t.trans
	Spülmaschine	2	syn.1.trans
P10_FPE	Spülmaschine	2	pref.t.trans
	Geschirrspülmaschine	2	syn.1.trans
	Geschirrspüler	1	syn.2.trans

Table 1: Mapping of term variant to translation event type

In a second experiment, we evaluated the use of cognates in translations corpus data (taken from the English-German Translation Corpus of TU Chemnitz²) with machine translated data (Google Translate) for 13 English-German cognates that occurred more than five times in the corpus data. Cognates “are those translation words that have similar orthographic-phonological forms in the two languages of a bilingual [...]”; non-cognates are those translations that only share their meaning in the two languages [...]” (Costa, Caramazza, and Sebastian-Galles 2000, 1285). In the language pair English-German, *system* and *System* are for example cognates, while *government* and *Regierung* are non-cognates. *System* is not always the best translation for *system*, however; depending on the context, translations like *Anlage* (roughly ‘installation’) or *Verfahren* ‘procedure’ may be better options. So called false friends are different from cognates in that false friends are two words that share the same (or a very similar) form, but not the same meaning across two languages, like the English word *actual* (real, existing) vs. the German *aktuell* (current, latest).

A comparison of the machine translated texts reveals that the machine translation system used has a strong affinity towards the use of cognates in translation, while human translations show variation (see Čulo and Nitzke 2016) such as in the following example:

Source: “[...] political stability rested on the acceptance in all classes of the legitimacy [...]”
 Target: “[...] beruhte ihre Stabilität darauf, daß alle Klassen die Legitimität [...] akzeptierten”
 Lit.: [...] *rested their stability on that all classes the legitimacy [...] accepted*

Here, the English noun *acceptance* was translated by the German verb *akzeptieren* ‘accept’. We assume that a word class shift is a cognitively different operation from translation by a cognate in the same word class and thus do not count this as cognate translation. The reason for such variation may be motivated by the fact that noun and verb of the same root may not always have exactly the same meanings: we would argue that the German word *Akzeptanz* is not used in the same way as *acceptance*, but rather as some sort of rate of acceptance, i.e. a rising or falling acceptance towards some measure or phenomenon.

3. Conclusions and further work

In the two evaluations made on existing machine translations, post-edits and translations-from-scratch we identified the lexical level, more specifically terms and cognates, as dimensions along which these three types of translations products can be contrasted. The exact nature of results will, of course, to a large extent depend on the characteristics of the machine translation systems used.

Further questions arise from the observations made: If the texts from the cognate evaluation were post-edited, would patterns of cognate use remain in the post-edited texts? If so, which cognitive processes would need to be trained or triggered in order to introduce desired (because motivated) patterns of variation? And ultimately, could patterns of cognate use “spill over” into original language production, e.g. replacing non-cognates over time? If so, and if one could show that this was due to exposure of (partially) machine-generated translations, then machine translation would be established as a driving force of language change.

4. References

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² <http://ell.phil.tu-chemnitz.de/search/>

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