On the Impact of Machine Translation on the Quality of the final Review outputs

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Overview

- Research questions
- Coding process
- Error scheme
- Data preparation
- Analytical approach
- Preliminary results
- Conclusions / Limitations

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Research questions

- Is the translation quality (at textual level) of the final review output affected by introducing Machine Translation (MT) & Post-Editing (PE)?
  If so, is it to the better or to the worse?
- Are the differences conditional to group effects, a group defined as the combination of language and type of Post-Editing?

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Coding process

- For both languages GER + RUS identical
- Each 2 experienced and qualified linguists / questionnaire translators coded separately
- Then the 2 persons agreed on coding in “coding harmonization meeting”
- 3rd person in the coding harmonization meeting = adjudicator, involvement in case of uncertainties
- Error subcategory + Severity level
- Additional code: “Fixed source”

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Error scheme

- Developed based on Multidimensional Quality Metrics (DQF-MQM), developed to assess translation quality
- Adapted to questionnaire translation by the project team
- First level Error Categories:
  Accuracy – Fluency - Survey-specific terminology/phrases and features – Style – Locale convention – Verity – Other
- Second level Error Subcategories, examples: *Omission – Register – Mistranslation of survey-specific terminology/phrases*

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Coding process: Error scheme + severity levels

Severity levels:

- **Major:** Major level of severity means that the translation completely changes the meaning, likely misleads the respondent, or provides incorrect, missing and/or contradictory information.
- **Minor:** Minor errors may affect the respondent's comprehension of translated text and increase the time required to read and to understand the translation.
- **Neutral:** Neutral errors include those that might make the translation a bit harder to understand, but ultimately do not stop the respondent from overall understanding and using the translation in terms of the measurement goal.

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Data preparation

- Translations resulting from the Review meetings
- Baseline (2 human translators)
  Experimental condition 1 (human translator + Full Post-editing)
  Experimental condition 2 (human translator + Light Post-editing)
- Both languages separately (GER + RUS)
- Spelling and Punctuation errors taken out:
  - for Russian, quite a lot of these rather minor errors;
  - they would possibly have biased the results;
  - therefor decision to remove these;
  - this is also in line with reality, as in real-life, these would be corrected after the Review session

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Analytical approach

- Null hypothesis: H0: p1 - p2 = 0
  (There is no difference in the number of errors in the final Review output between the baseline and the experimental conditions.)
- Equation Z-test:

$$\frac{(\bar{p}_1 - \bar{p}_2) - 0}{\sqrt{\bar{p}(1-\bar{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

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Preliminary results

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Overall number of errors

- Number of errors in Baseline review GER: 30
- Number of errors in Baseline review RUS: 45

- Number of errors in Full PE review GER: 33
- Number of errors in Full PE review RUS: 30

- Number of errors in Light PE review GER: 68
- Number of errors in Light PE review RUS: 39

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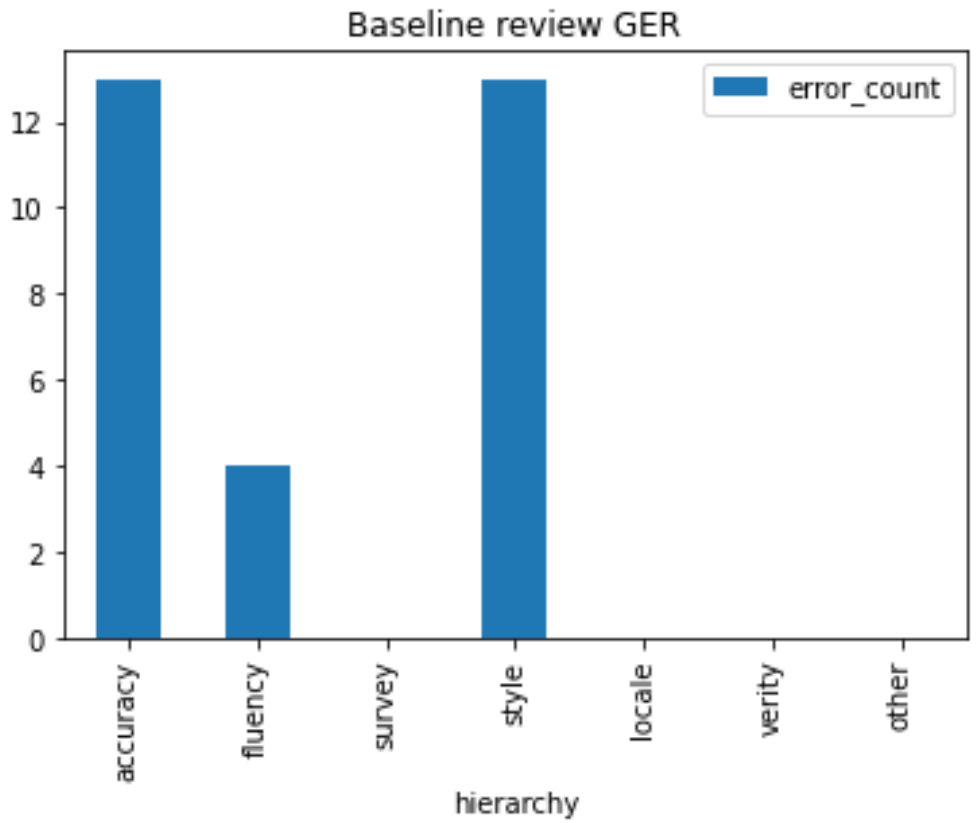
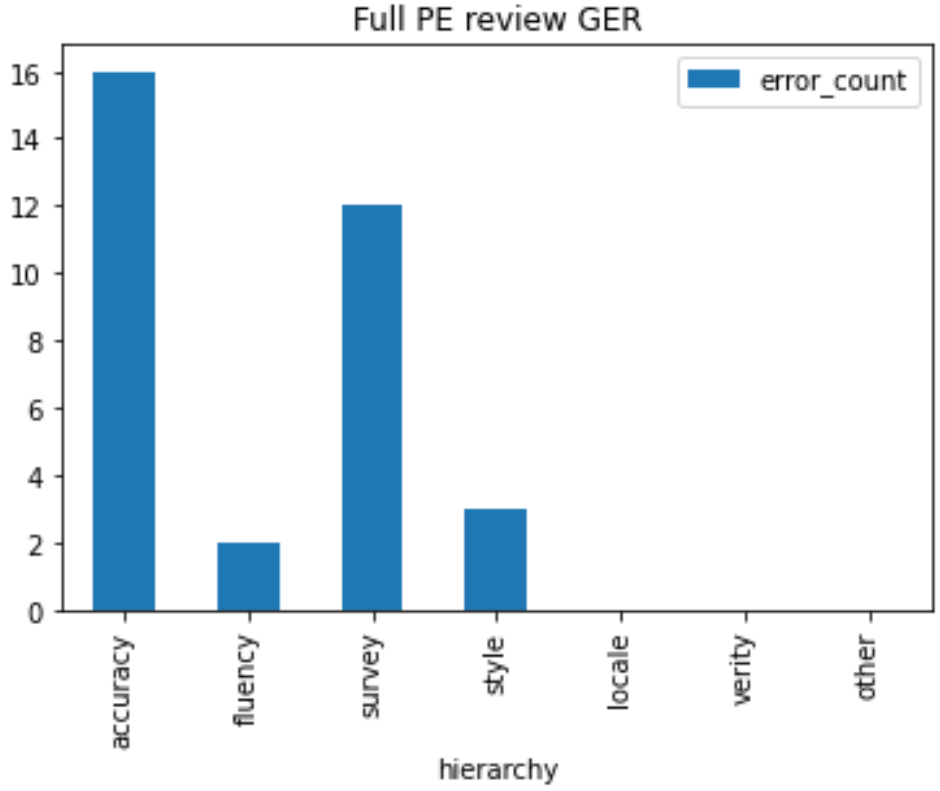
Example BSLN GER vs FULL PE GER

- The value of p is .68916.
- The result is not significant at p < .05.
- **NO difference**





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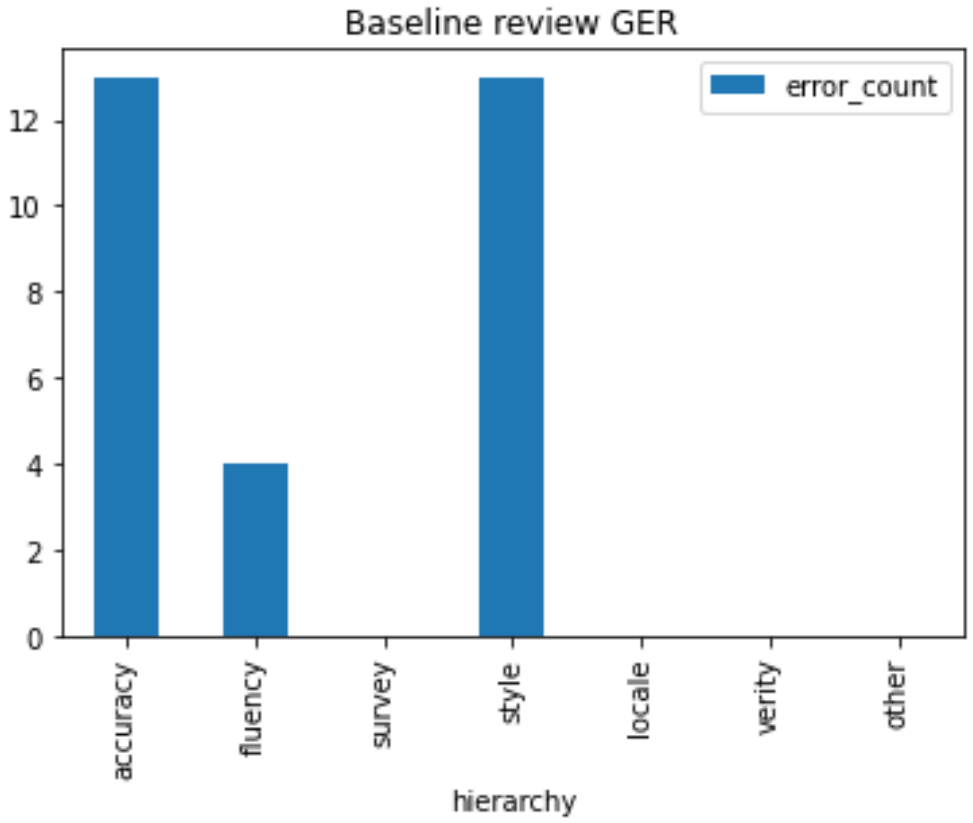
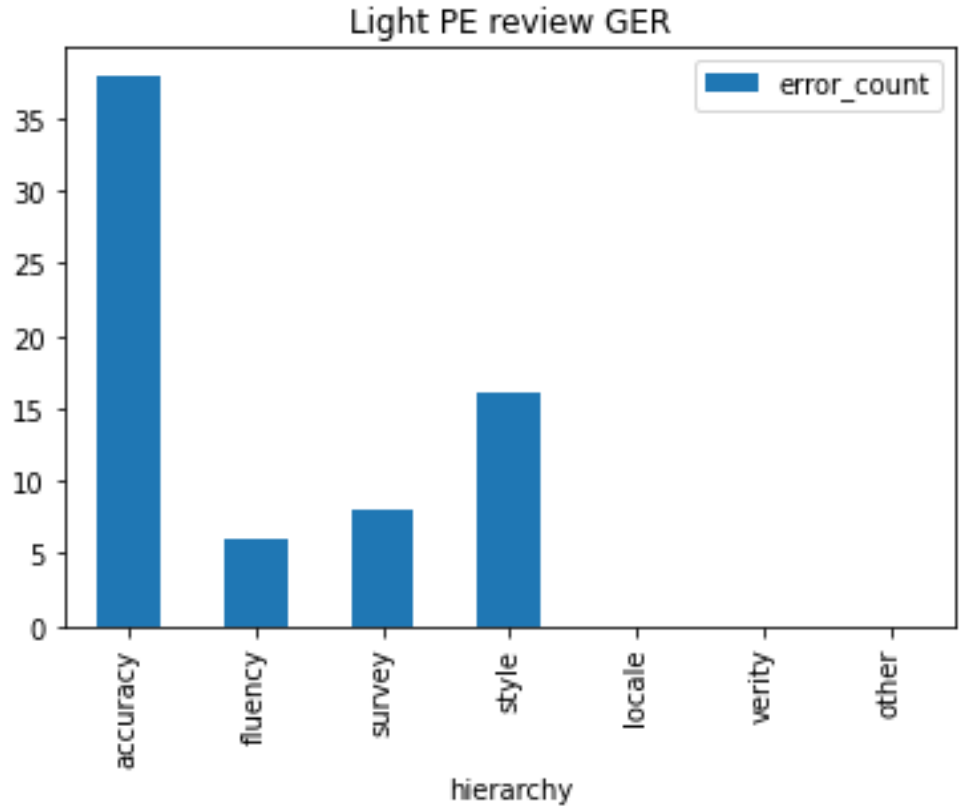
Example BSLN GER vs LIGHT PE GER

- The value of p is < .00001.
- The result is significant at p < .05.
- **Difference = LIGHT has more errors**





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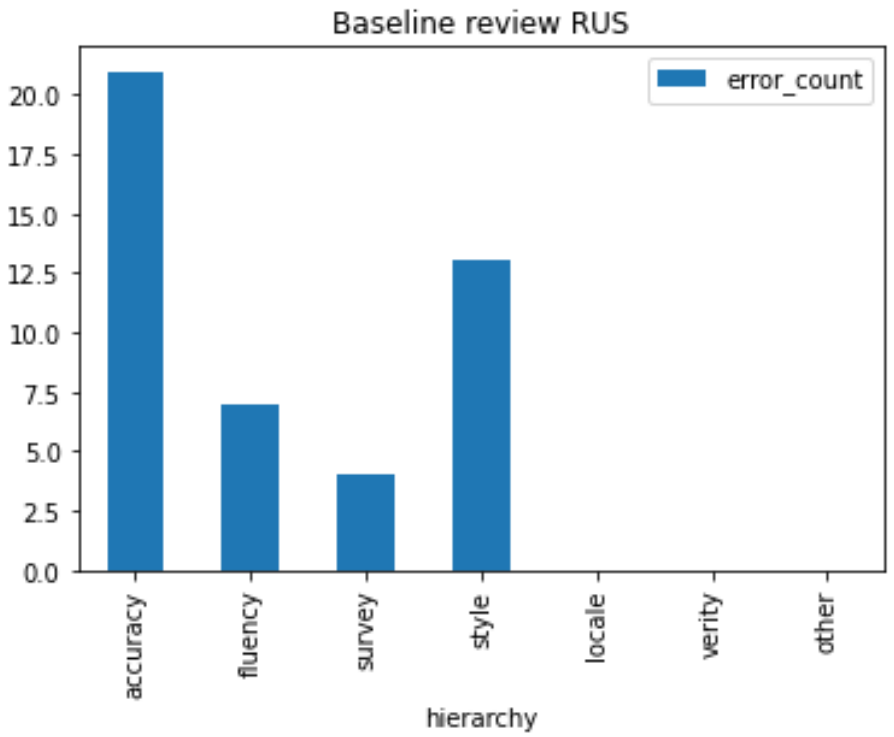
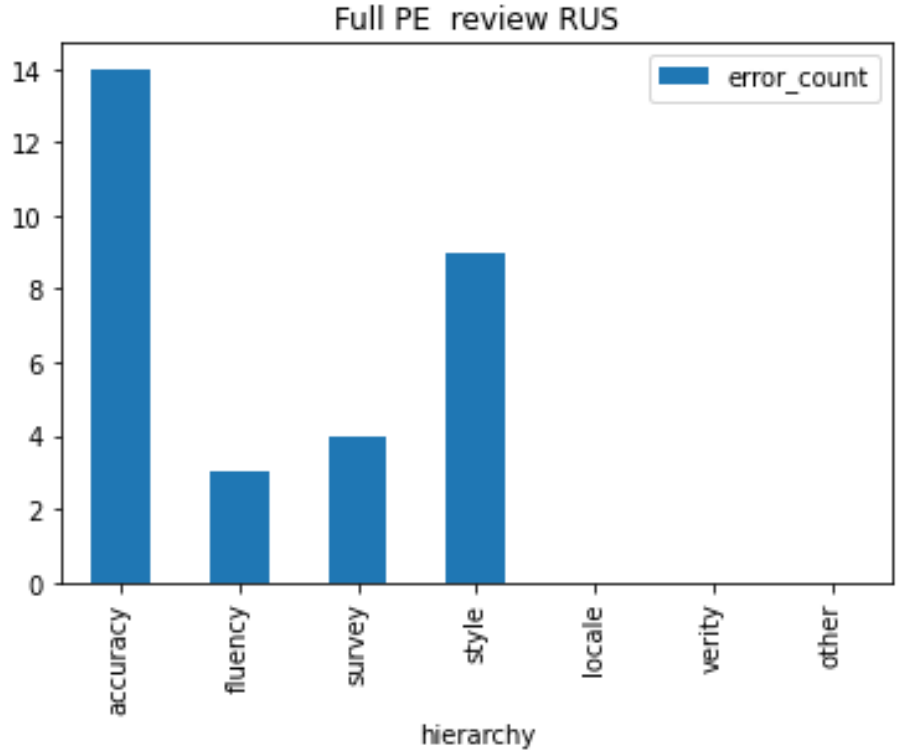
Example BSLN RUS vs FULL PE RUS

- The value of p is < .00001.
- The result is significant at p < .05.
- **Difference = BASELINE has more errors**





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Example BSLN RUS vs LIGHT PE RUS

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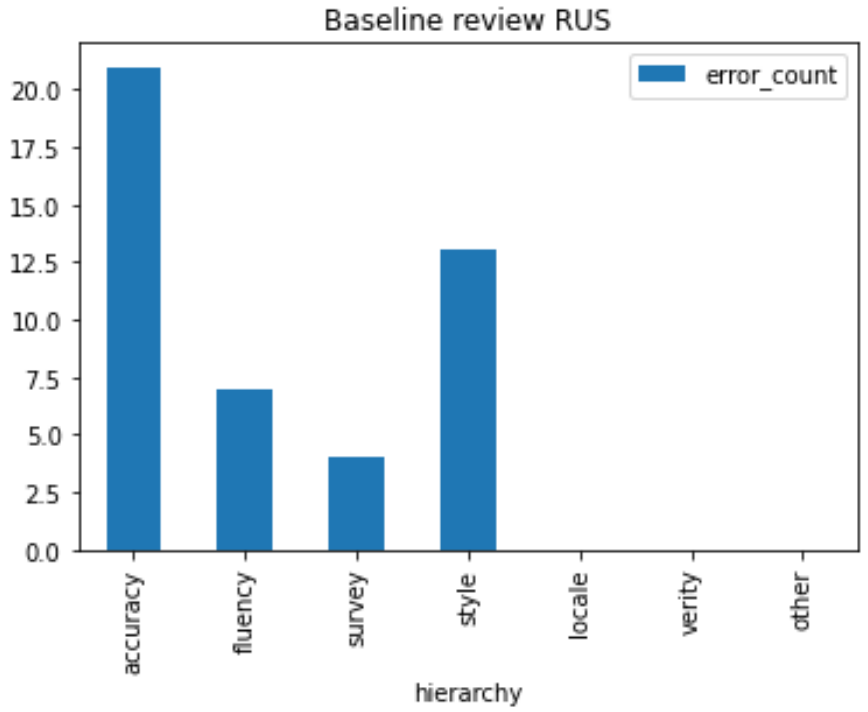

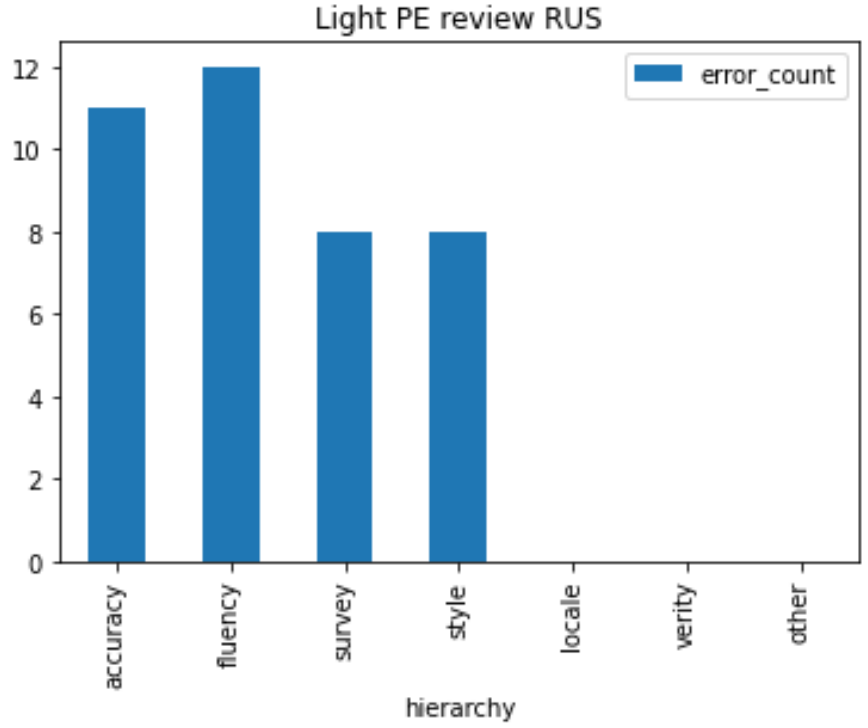

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Conclusions / Limitations

- In Russian, the involvement of MT had overall a positive effect on the final quality of the Review version.
- In German, the effect of adding MT is not clear because in both Review results we had different effects.
- Details will be presented in later presentations in this ESRA session.

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Thank you for your attention!

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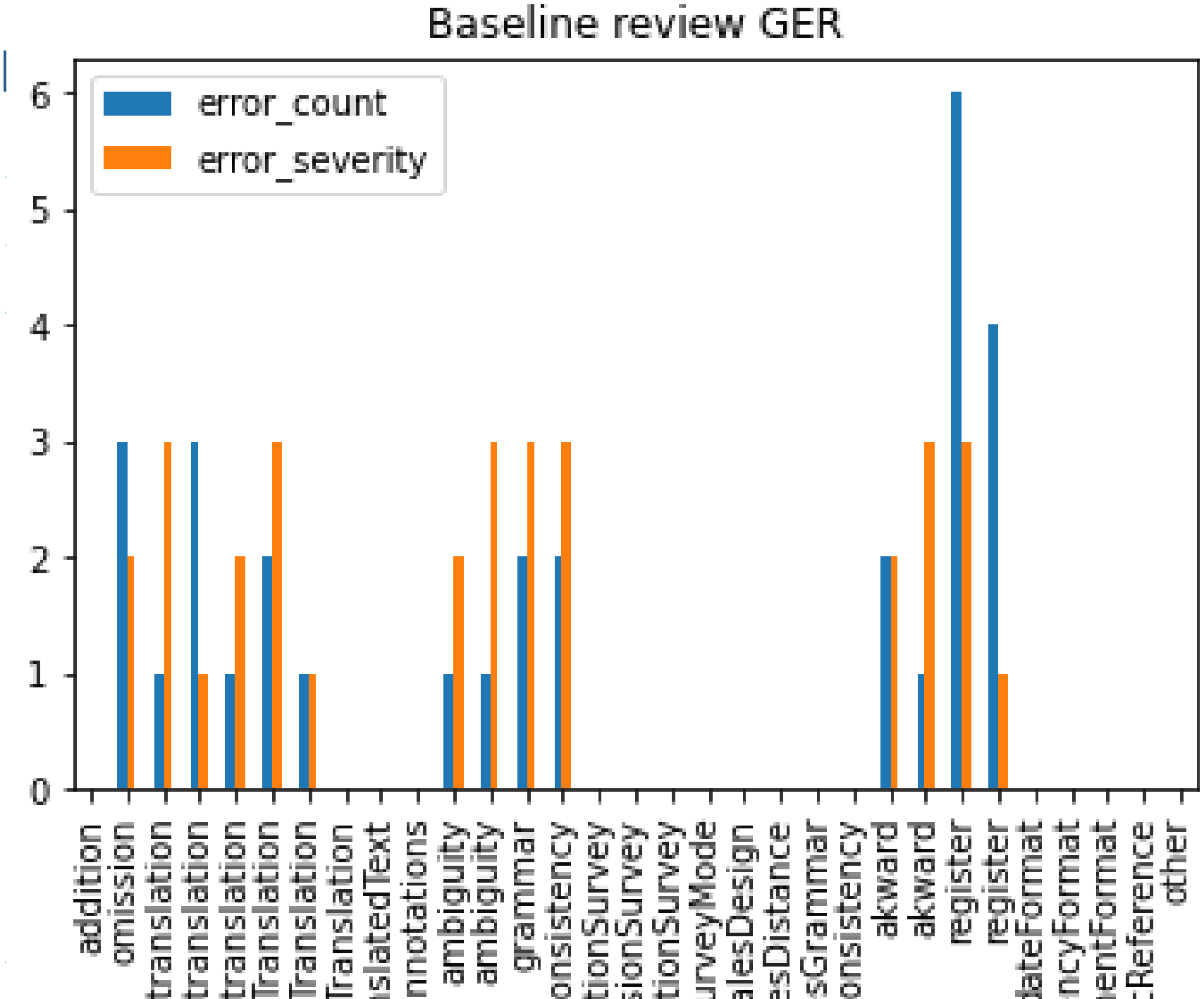
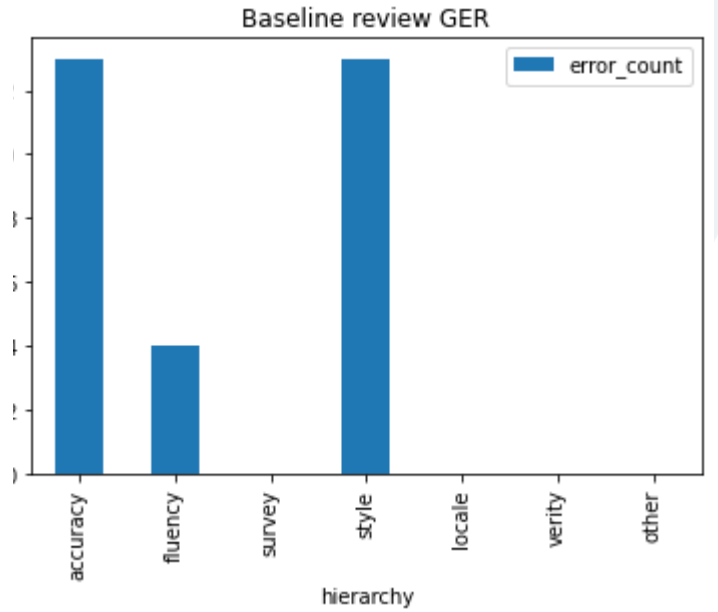
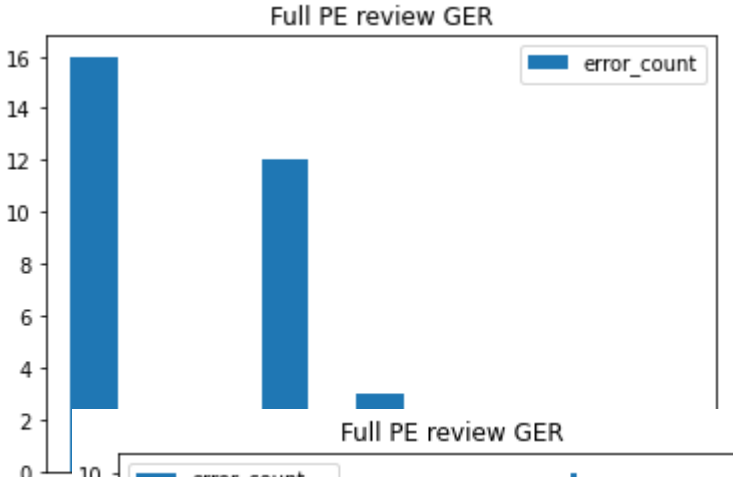
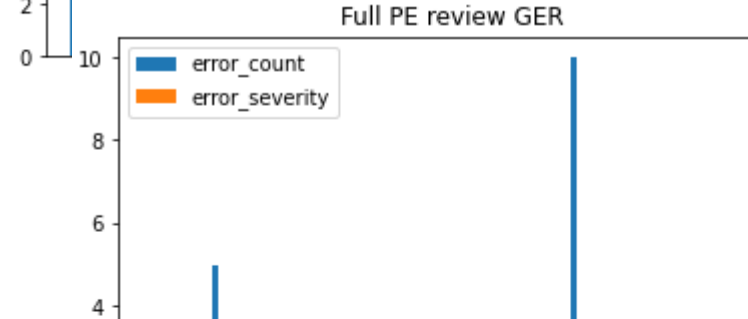

Baseline review GER
error_count
error_severity
0
1
2
3
4
5
6
addition
omission
translation
translation
translation
Translation
Translation
Translation
ambiguity
ambiguity
grammar
akward
akward
register
register
other

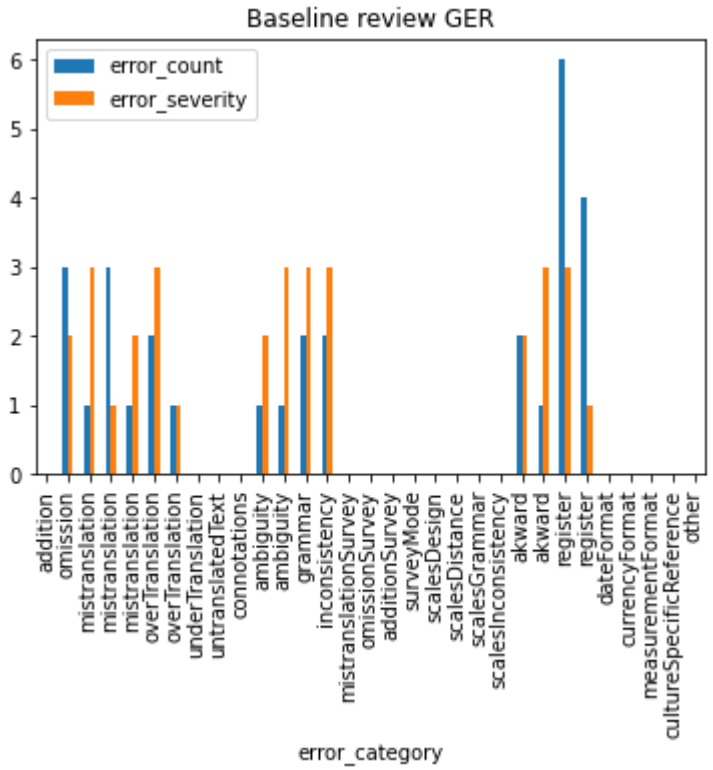

Baseline review GER
error_count
accuracy
fluency
survey
style
locale
verity
other
hierarchy

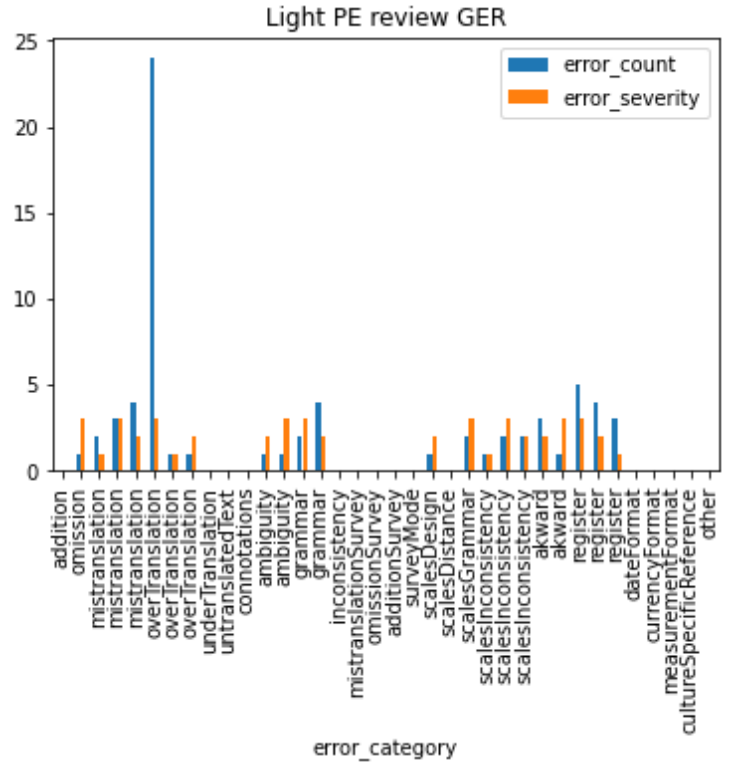

Full PE review GER
error_count
0
2
4
6
8
10
12
14
16

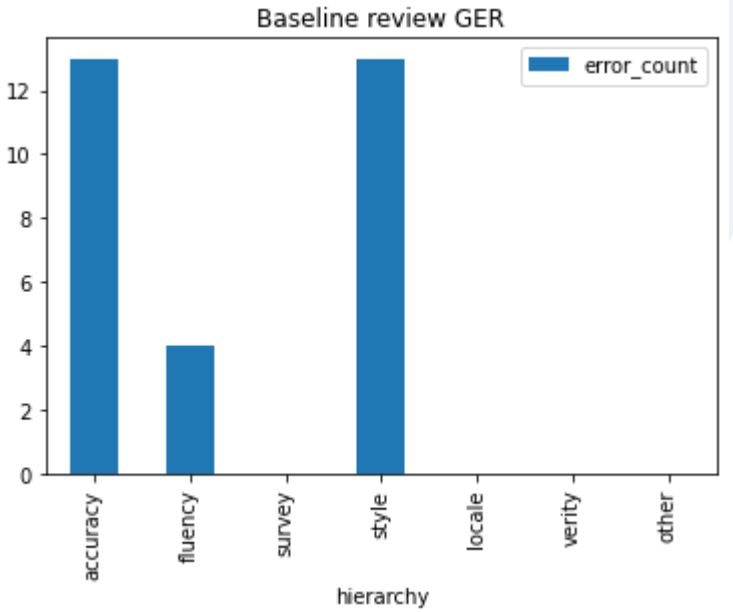

Full PE review GER
error_count
error_severity
0
4
6
8
10

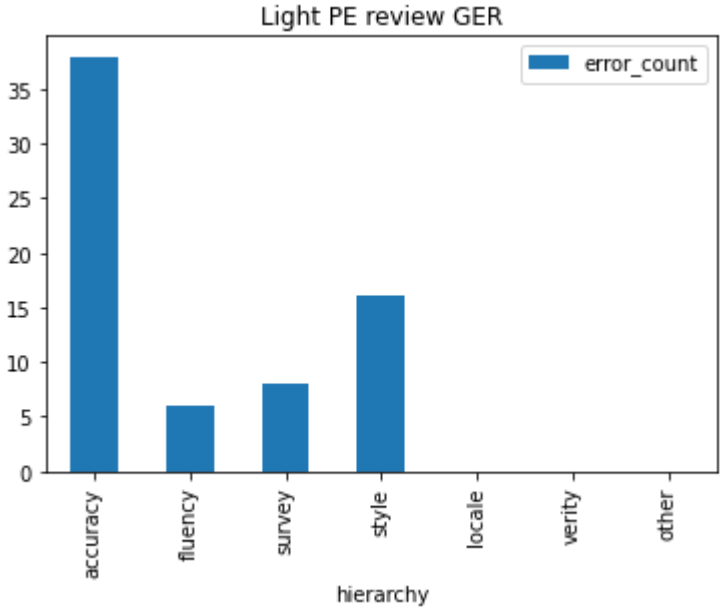
Example BSLN GER vs LIGHT PE GER

- The value of p is < .00001.
- The result is significant at p < .05.
- **Difference = LIGHT has more errors**









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Example BSLN RUS vs FULL PE RUS

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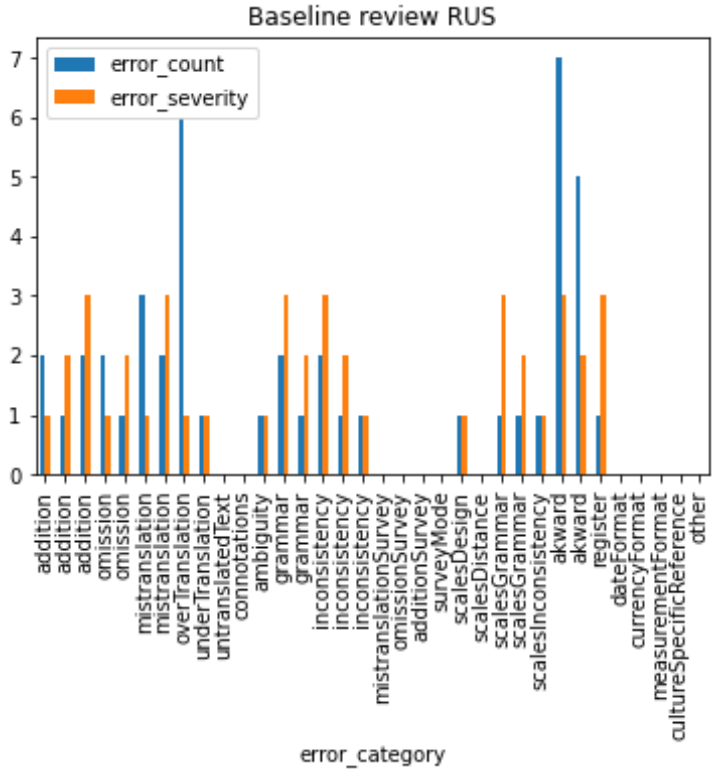

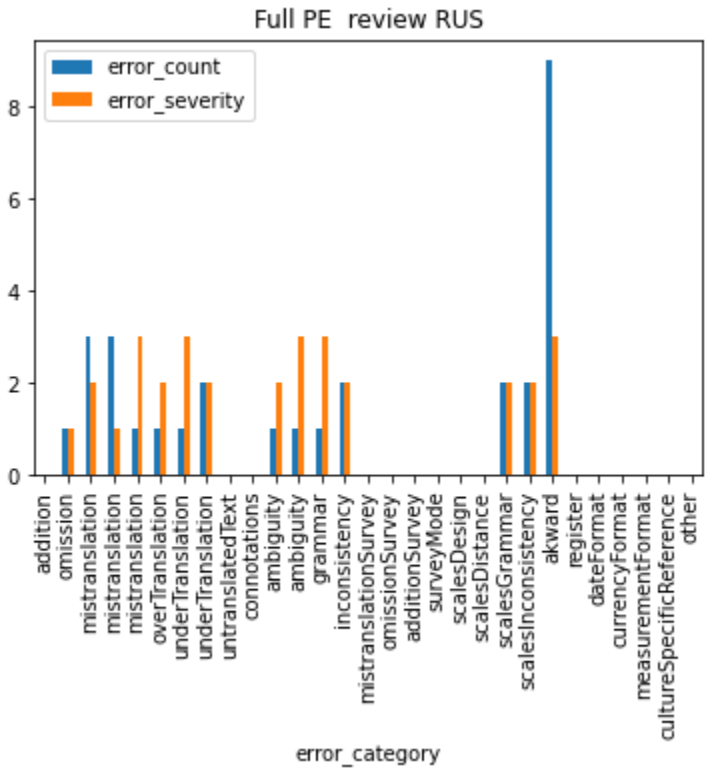

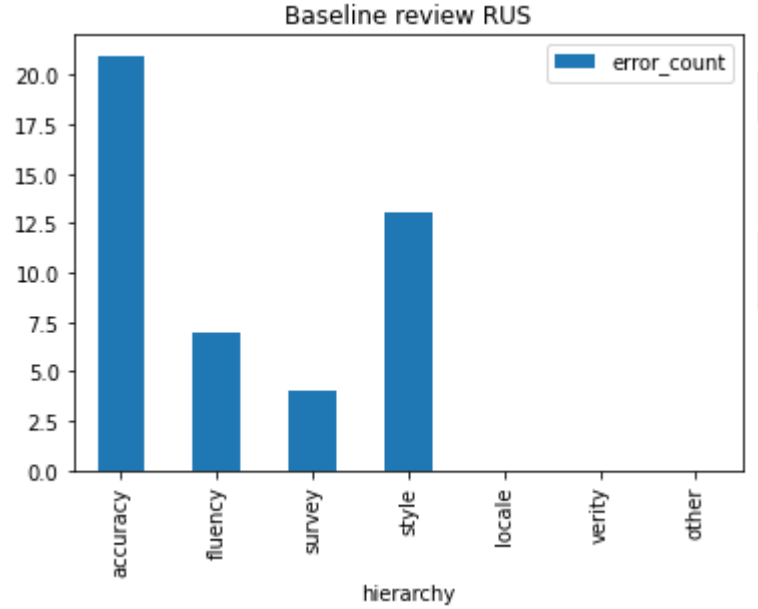

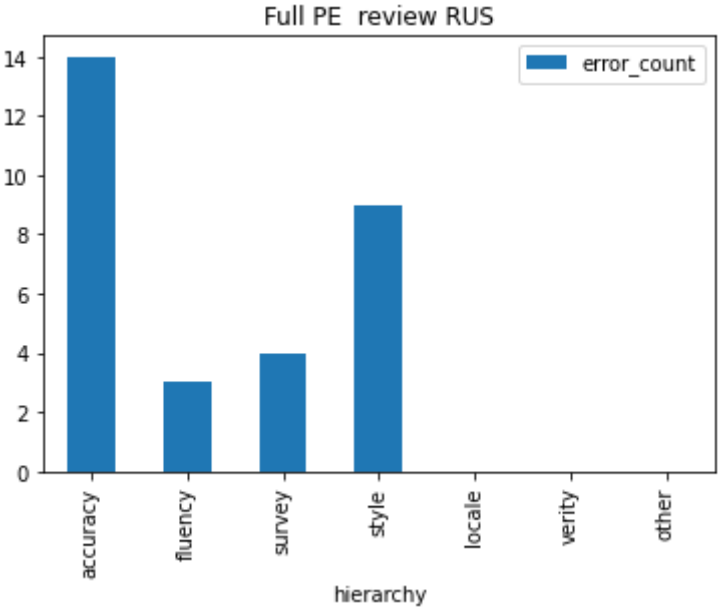

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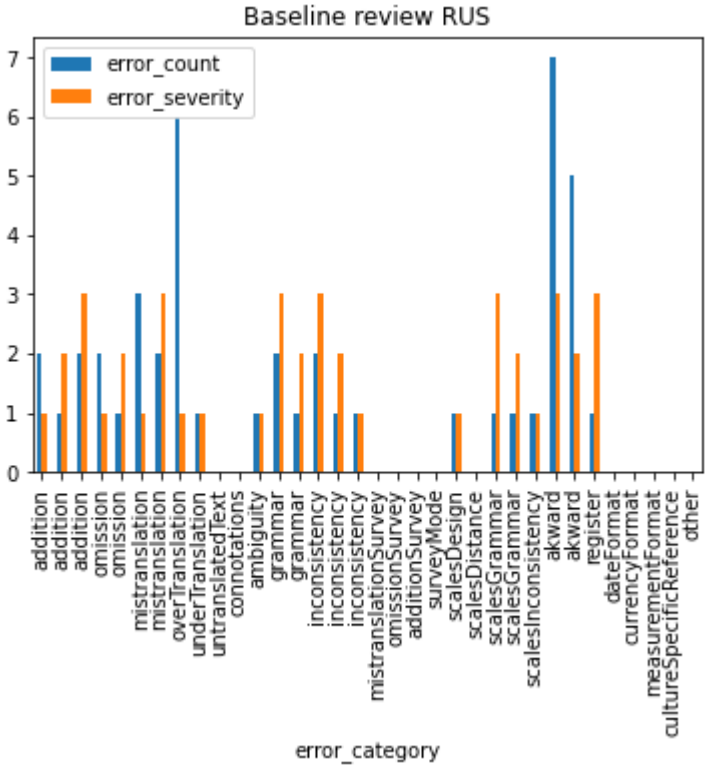

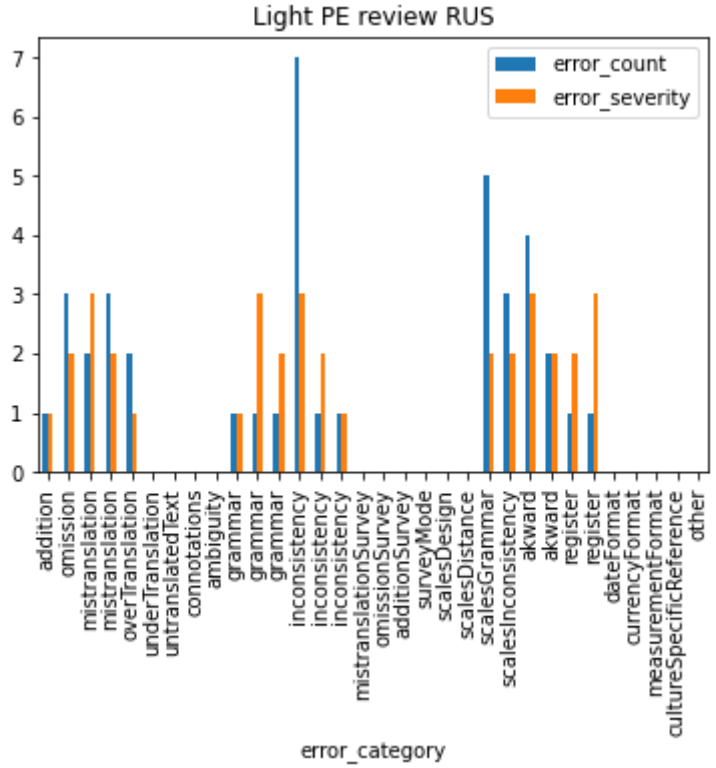

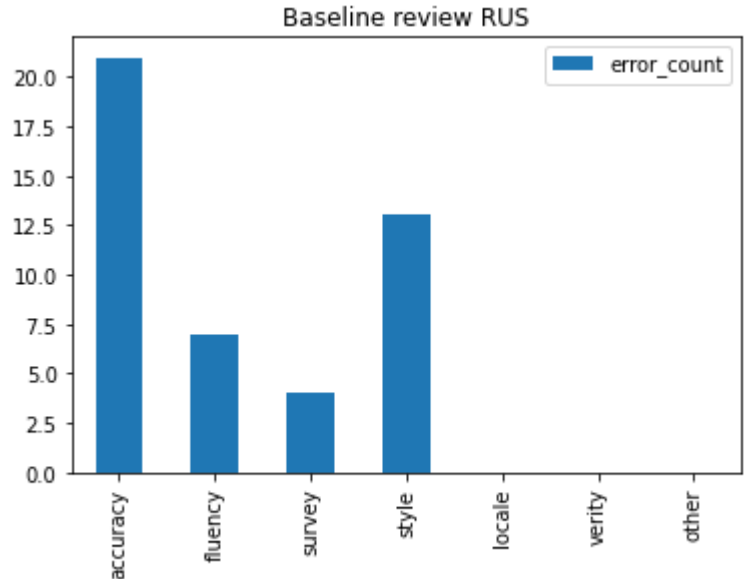

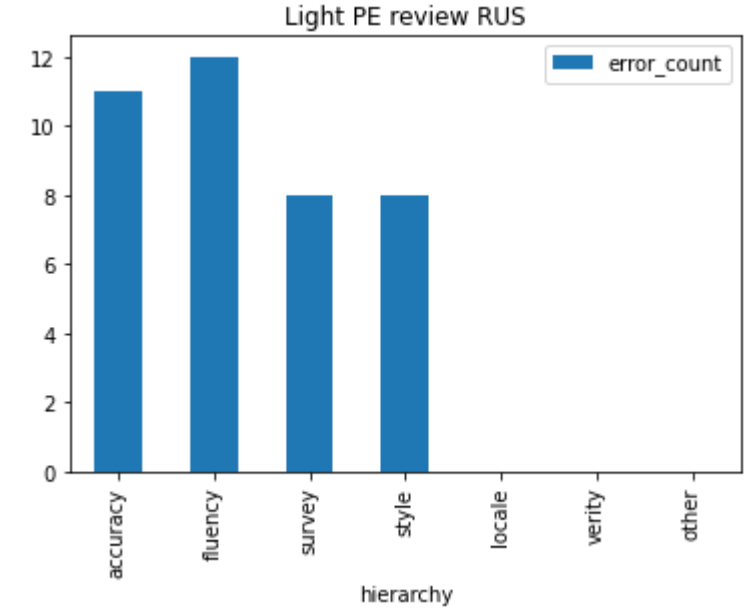

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