



# COCHRANE PLAIN LANGUAGE SUMMARIES:

**A study of authors' satisfaction and users' comprehension**

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# BACKGROUND AND MOTIVATION (1)

- **Cochrane:** a not-for-profit organisation providing high-quality health information on the impact of treatments and surgical interventions by means of **systematic reviews**.
- **Plain language summaries (PLS)** summarise and simplify systematic reviews for the lay public.
- Volunteer authors manually checking and implementing **different sets of simplification guidelines:**
  - difficult and time-consuming task (Temnikova 2012; Aikawa et al. 2007).
- Contradictions, inconsistencies and vagueness:
  - reduced readability of PLS (Karačić et al. 2017; Flodgren 2016).

## BACKGROUND AND MOTIVATION (2)

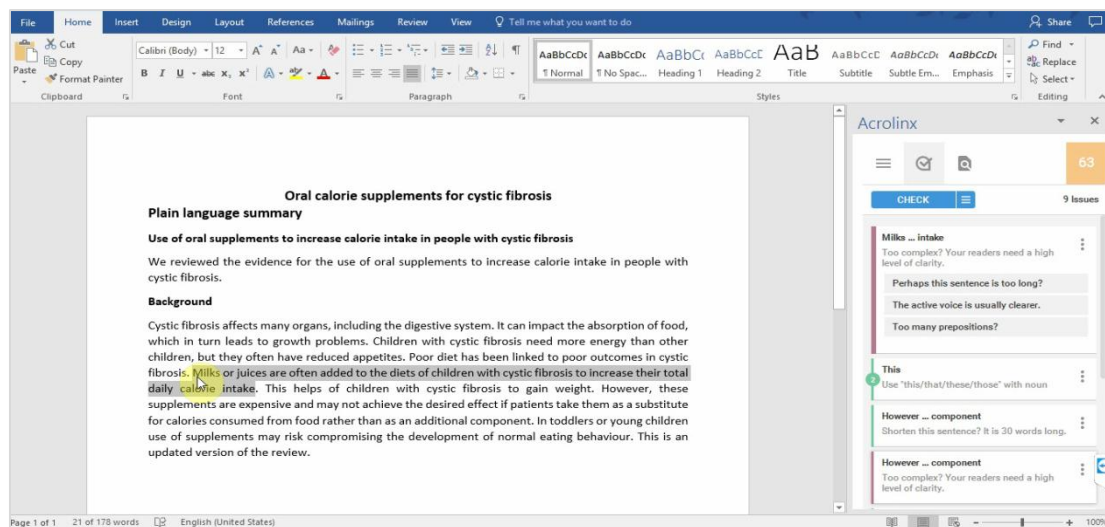
- Introducing **technological support**/assistance for authors might:
  - (i) increase their satisfaction;
  - (ii) ensure higher consistency and clarity of simplification rules, thus making texts more comprehensible (Leroy et al. 2013).
- **Acrolinx**: a tool which ensures comprehensibility
  - by automatically checking texts against a set of simplification rules, e.g. on style, tone of voice, and terminology;
  - by proving suggestions and examples (Rodríguez Vázquez 2016).

# RESEARCH QUESTIONS

- Does integrating Acrolinx into Cochrane's standard workflow of PLS production
  - increase Cochrane volunteer authors' satisfaction?
  - facilitate reading comprehension of Cochrane PLS among lay public?

# CHARACTERISTICS OF THE INTEGRATION

## ➤ Acrolinx as a plugin in Microsoft Word



- 12 Cochrane authors asked to use Acrolinx
  - to check for readability/comprehensibility issues in their PLS (previously produced by following Cochrane guidelines);
  - to revise the PLS accordingly.

# METHOD(S) AND PARTICIPANTS

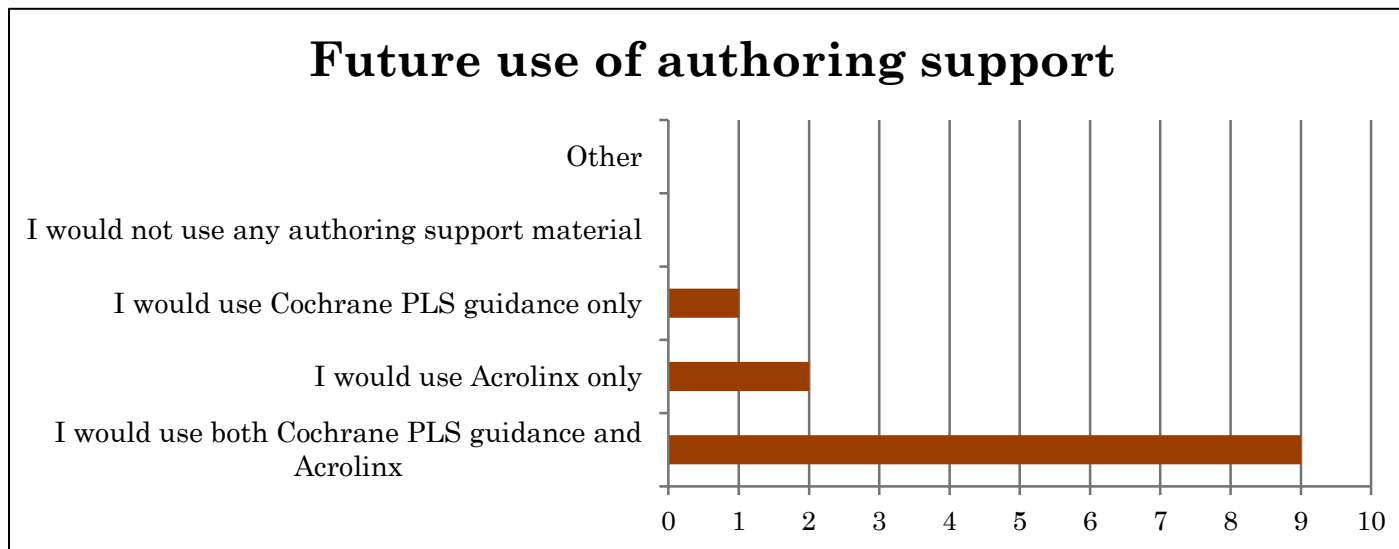
- **Authors' satisfaction:** System Usability Scale (SUS) (Brooke 1996) and follow-up preference questions
  - 10 statements, Likert scale;
  - the higher the SUS score, the higher the satisfaction.
- 12 Cochrane authors (health professionals)
- **Reading comprehension:** ratings and (free and cued) recall (Crossley and McNamara 2016)
  - free recall: everything a reader can remember about a text;
  - cued recall: everything a reader can remember about a specific theme/section of the text;
  - controlling for reading skills and prior knowledge.
- 59 native speakers of English and 23 non-native speakers of English (no health background)
- Within-subjects design: pre-Acrolinx PLS, post-Acrolinx PLS and abstract (non-simplified summary/baseline) per reader

# FINDINGS ON AUTHORS' SATISFACTION (1)

- On average, Cochrane authors were more satisfied with Acrolinx (M=**75.41**, SD=14.49) than with Cochrane sets of guidelines (M=**62.29**, SD=26.53).
- The difference was not statistically significant,  $t(11)=1.25$ ,  $p=0.23$ .

## FINDINGS ON AUTHORS' SATISFACTION (2)

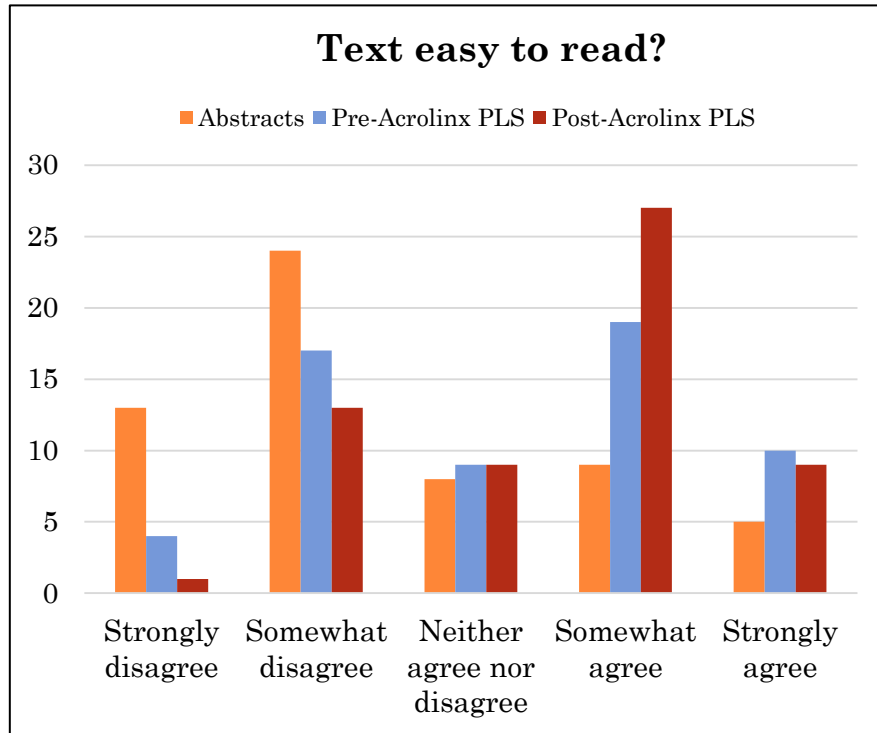
- Authors showed a preference for using Acrolinx **in combination** with Cochrane PLS guidelines in the future.



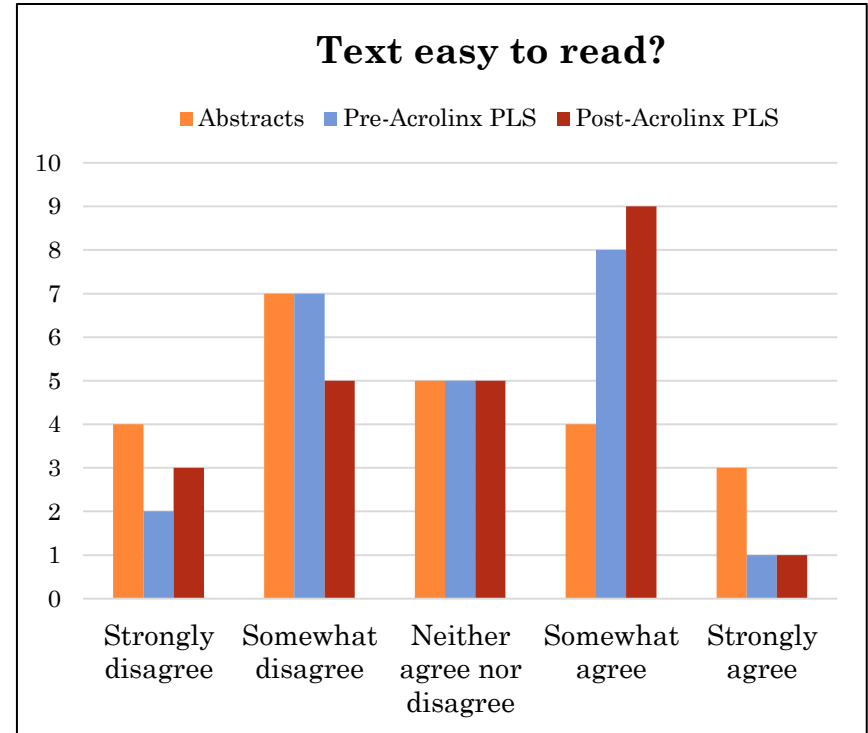
- All authors recognised the need for support when simplifying content.



# FINDINGS ON READING COMPREHENSION (RATINGS)



*Native speakers*



*Non-native speakers*

- In both groups, compared with pre-Acrolix PLS, slightly higher number of participants who found post-Acrolix PLS easy to read;
- Most native and non-native speakers (strongly or somewhat) disagreed with the fact that abstracts were easy to read.

# FINDINGS ON READING COMPREHENSION (FREE AND CUED RECALL) (1)

*(\* and (\*\*): statistically significant differences (at 0.05 significance level), as shown by within-subjects ANOVAs and follow-up pairwise comparisons.*

## *Free recall, native speakers of English*

Corpora	Free recall score <i>Mean (SD)</i>
Pre-Acrolinx PLS	13.39 (7.59) (*)
Post-Acrolinx PLS	12.87 (7.28) (**)
Abstracts (baseline)	9.08 (5.21) (*) (**)

## *Cued recall, native speakers of English*

Corpora	Cued recall score <i>Mean (SD)</i>
Pre-Acrolinx PLS	14.9 (9.09) (*)
Post-Acrolinx PLS	15.72 (12.58) (**)
Abstracts (baseline)	29.77 (21.4) (*) (**)

## *Free recall, non-native speakers of English*

Corpora	Free recall score <i>Mean (SD)</i>
Pre-Acrolinx PLS	8.36 (5.09) (*)
Post-Acrolinx PLS	8.26 (5.38) (**)
Abstracts (baseline)	5.26 (4.05) (*) (**)

## *Cued recall, non-native speakers of English*

Corpora	Cued recall score <i>Mean (SD)</i>
Pre-Acrolinx PLS	6.3 (8.25) (*)
Post-Acrolinx PLS	7.68 (9.4) (**)
Abstracts (baseline)	26.45 (29.97) (*) (**)

# FINDINGS ON READING COMPREHENSION (FREE AND CUED RECALL) (2)

- For both native and non-native speakers, the **introduction of Acrolinx did not prove beneficial** in terms of reading comprehension of PLS.
- Comprehension of **abstracts** (as assessed via **free recall**) was **significantly lower** than comprehension of both corpora of PLS.
- Comprehension of **abstracts** (as assessed via **cued recall**) was **significantly higher** than comprehension of PLS, possibly as a result of the following characteristics of abstracts:
  - increased use of bold headings to signal specific themes/sections;
  - increased cohesion between headings and content of sections;
  - reduced length of sections.

# FINDINGS ON READING COMPREHENSION (FREE AND CUED RECALL) (3)

- For both the native and non-native sample, the within-subjects ANCOVAs on free and cued recall including the covariates (reading skills and prior knowledge\*) were not significant.
  - Free recall, native speakers of English:  $F(1.638, 91.719)=1.263$ ,  $p=0.283$ ,  $\eta_p^2=0.022$ .
  - Cued recall, native speakers of English:  $F(2, 114)=0.267$ ,  $p=0.766$ ,  $\eta_p^2=0.005$ .
  - Free recall, non-native speakers of English:  $F(2, 40)=0.581$ ,  $p=0.564$ ,  $\eta_p^2=0.028$ .
  - Cued recall, non-native speakers of English:  $F(2,40)=0.597$ ,  $p=0.556$ ,  $\eta_p^2=0.029$ .
- However, none of the two covariates had significant effects on free and cued recall scores ( $p>0.05$ ).

*\*Prior knowledge excluded as a covariate from the ANCOVA on cued recall of native speakers because it did not meet the assumption of homogeneity of regression slopes.*

# IMPLICATIONS AND FUTURE WORK

- Identifying a simplification scenario that boosts authors' satisfaction might lead them to simplify more health content for the lay public.
- Possible characteristics of the integration of Acrolinx:
  - Cochrane sets of guidelines to be used at the summarisation stage;
  - Acrolinx to be used at the simplification stage.
- Need to test other authoring support tools and their impact on comprehension, to reduce the vulnerability of lay users of health content.
- Need to further investigate the relative impact of reading skills and prior knowledge on comprehension.
- Overall, simplification is beneficial in terms of comprehension, but other text characteristics can further enhance comprehensibility, e.g. formatting, layout, or content segmentation (Rusko et al. 2012; Tait et al. 2005; Frost et al. 1999).

# THANK YOU FOR YOUR ATTENTION!

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