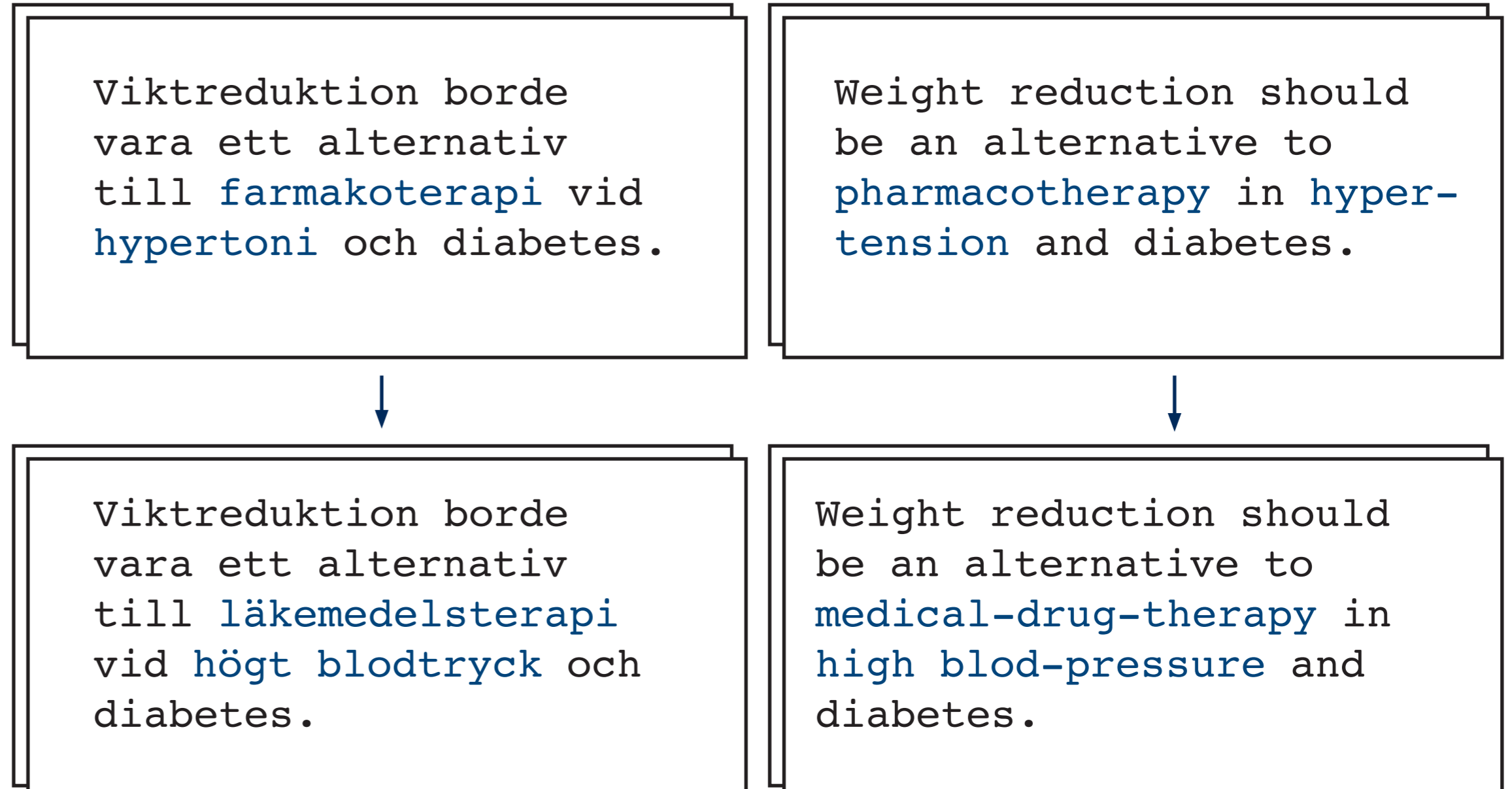


Medical text simplification using synonym replacement: Adapting assessment of word difficulty to a compounding language

Emil Abrahamsson, Timothy Forni, Maria Skeppstedt, Maria Kvist

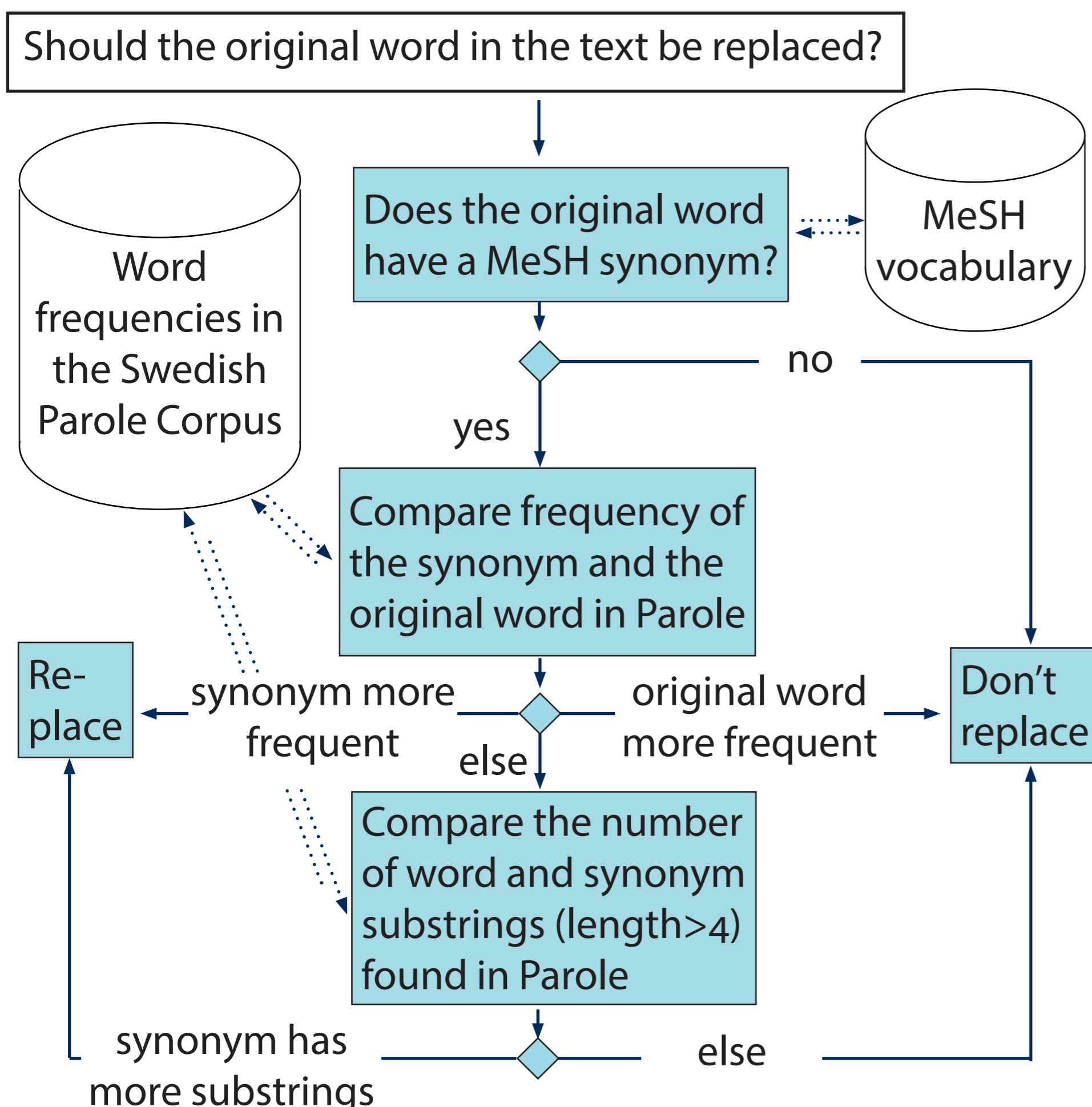
Medical texts can be difficult to understand for laymen, due to a frequent occurrence of specialised medical terms. Replacing these difficult terms with easier synonyms can lead to improved readability.

We have adapted a method for assessing word difficulty to make it more suitable to the compounding nature of (medical) Swedish.



Method

Whenever a word had a synonym that was assessed as easier, it was replaced by the synonym, as follows:



An example of how the substrings are counted:

Substring examples	1	2	3	4
hemangiom	-	-	-	-
blodkärlstumör	blod	kärl	blodkärl	tumör

The word hemangiom will be replaced by blodkärlstumör, as it contains more substrings found in Parole.

Results

The method was applied to 10 000 randomly selected sentences from the Swedish medical journal 'Läkartidningen' (issues from 1996). Two automatic readability measures were applied:

	LIX	OVIX
Original text	50	87.2
After synonym replacement	51	86.9

A preliminary reader study was performed on 140 sentences (a subset of 195 extracted sentences in which the synonym replacement did not change the original meaning):

Perceived effect after replacement	Evaluator 1 All (Unique)	Evaluator 2 All (Unique)
No difference	51% (52%)	29% (28%)
Easier	42% (42%)	54% (52%)
More difficult	7% (7%)	17% (21%)

Future work

E.g. a more extensive user study and expanding Swedish medical synonym vocabularies.

References

- Keskisarckä R. and Jönsson A. 2012. Automatic text simplification via synonym replacement.
- Leroy G. et al. 2012. Improving perceived and actual text difficulty for health information consumers using semi-automated methods.