Title. Reading medical science journals: the role of vocabulary size and background knowledge.

Introduction. This paper discusses reading comprehension in medical science journals and aims to disentangle the impact of vocabulary size and background knowledge. Milton[3] and Nation[4] suggest that readers need to know 95% of the running words of a text for adequate comprehension. However, despite Clapham's seminal study[1] on the impact of background knowledge on reading, its interaction with vocabulary size remains opaque. This study, therefore, aims (a) to determine the vocabulary profile of a medical science paper and (b) to describe the impact of vocabulary size and background knowledge on reading.

Method. One complete intake of radiology technology students (n=28) at Fachhochschule Wiener Neustadt was subjected to two test instruments: (a) the Vocabulary Size Test (VST) and (b) a reading comprehension test based on a full-length journal article[6]. The vocabualry profile of this paper was subsequently analysed using Cobb's lexical profiler[2] and the technical terms were identified based on the NCRP Composite Glossary[6]. Finally, mean grades on students' technical subjects were used as a proxy for their background knowledge.

Vocabulary size and coverage. Based on the results of the VST, the mean vocabulary size among the sample was 7432 words (minimum 5300; maximum 10,200). Despite these respectable figures, an analysis of the input text reveals that knowledge of 5000 words means being familiar with 87% of the input text, with 7500 words providing 89% coverage, and 10,000 words generating 91% coverage. Hence, no test taker reached the 95% threshold necessary for adequate comprehension. Nonetheless, no major comprehension problems were reported, and the reading test did not indicate any difficulties either, generating a mean score of 80%. Consequently, it is plausible to assume that a large proportion of the input text consisted of technical terminology, which the students probably knew because of its specialist nature. This will have increased their vocabulary coverage and thus facilitated comprehension.

Indeed, there is empirical evidence for this explanation. Assuming that our readers are familiar with the specialist vocabulary identified in the text alters the coverage of the text dramatically: hence, knowledge of 5000 words plus specialist terminology results in 94% coverage, with 7500 words generating 95% coverage, and 10,000 words 96% coverage. That means knowledge of specialist vocabulary boosts coverage to the threshold required for adequate understanding. It is, therefore, quite plausible for technical vocabulary - and by extension background knowledge - to have a major impact on reading comprehension, while knowledge of general vocabulary beyond the 5000-word level may be taking a back seat. This conjecture is tested in the next section on the basis of the following regression analysis.

Regression analysis. Multiple regression allows us to predict the impact of vocabulary size and background knowledge on reading comprehension. The analysis reveals that both variables together (i.e. vocabulary size and background knowledge) explain 36.8% of the reading scores, $F_{(2, 28)}=6.979$, $p<0.005$. That is, both vocabulary size and background knowledge together have a statistically significant impact on reading skills. However, only background knowledge makes a statistically significant unique contribution to reading scores (beta=0.538, $p<0.01$), while vocabulary size is not statistically significant (beta=0.121, $p>0.05$). In other words, the analysis confirms that background knowledge (including knowledge of technical terms) is a more relevant component in the reading of medical papers than mere vocabulary size beyond the 5000-word level.

Conclusion. These findings have interesting repercussions for teaching English for Academic Medical Purposes. First, focusing on vocabulary growth up to the 5000-word level is probably useful. However beyond this, only a consistent focus on technical terminology and, by extension, background knowledge substantially increases text coverage. This puts language instructors in a quandary: while technical terminology can be assumed to be the responsibility of language instruction, fostering background knowledge is clearly in the purview of subject specialists. Consequently - and as so often in ESP - some form of interdisciplinary cooperation may be required in these contexts.

References.

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