

P3 - Readability in Medical and Scientific Writing: Current Status and Emerging Trends from Cognitive Science

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INTRODUCTION

Good readability in medical and scientific writing ensures clarity, precision, and accessibility—three pillars of effective communication [1]. Yet, it has steadily declined over the past few decades [2]. Most readability metrics rely on grammatical or surface level features such as sentence and word length [3]. Recent research incorporates cognitive theories and AI-based approaches that better model how the brain processes text [4], [5], [6], [7]. However, these advancements remain underutilized, with limited diffusion and practical applications in medical and scientific writing.

METHODS

We conducted a narrative review, examining relevant peer-reviewed articles and tools to evaluate current readability metrics and their limitations. The analysis also identified emerging trends and novel applications for medical writing. The review is structured into five sections: a history of readability, cognitive theories of reading, the state of readability in science, new approaches to quantify readability, and barriers to effective implementation in medical and scientific writing.

RESULTS

New readability metrics extend beyond surface-level features, including insights into cognitive mechanisms such as working memory, comprehension, and predictive processes. We identified key practical gaps for their adoption, including: i) the lack of effective tools integrating these metrics into readability assessment, and ii) proper training and methodological frameworks for writers.

CONCLUSIONS

This review highlights advancements in readability methods that integrate cognitive factors. These can be developed into user-friendly tools for practical application, significantly improving clarity, precision, and accessibility—thereby enhancing and facilitating effective communication in medical and scientific manuscripts.

REFERENCES

- [1] T. Vergoulis, I. Kanellos, A. Tzerefos, S. Chatzopoulos, T. Dalamagas, and S. Skiadopoulos, "A Study on the Readability of Scientific Publications," in *Digital Libraries for Open Knowledge*, A. Doucet, A. Isaac, K. Golub, T. Aalberg, and A. Jatowt, Eds., Cham: Springer International Publishing, 2019, pp. 136–144. doi: 10.1007/978-3-030-30760-8_12.
- [2] P. Plavén-Sigray, G. J. Matheson, B. C. Schiffler, and W. H. Thompson, "The readability of scientific texts is decreasing over time," *eLife*, vol. 6, p. e27725, Sep. 2017, doi: 10.7554/eLife.27725.
- [3] R. G. Benjamin, "Reconstructing Readability: Recent Developments and

Recommendations in the Analysis of Text Difficulty,” *Educ Psychol Rev*, vol. 24, no. 1, pp. 63–88, Mar. 2012, doi: 10.1007/s10648-011-9181-8. [4] S. A. Crossley, S. Skalicky, and M. Dascalu, “Moving beyond classic readability formulas: new methods and new models,” *Journal of Research in Reading*, vol. 42, no. 3–4, pp. 541–561, 2019, doi: 10.1111/1467-9817.12283.

[5] S. A. Crossley, J. Greenfield, and D. S. McNAMARA, “Assessing Text Readability Using Cognitively Based Indices,” *TESOL Quarterly*, vol. 42, no. 3, pp. 475–493, 2008, doi: 10.1002/j.1545-7249.2008.tb00142.x.

[6] A. H. Zai, J. M. Faro, and J. Allison, “Unveiling readability challenges: An extensive analysis of consent document accessibility in clinical trials,” *Journal of Clinical and Translational Science*, vol. 8, no. 1, p. e125, Jan. 2024, doi: 10.1017/cts.2024.595.

[7] L. Ante, “The relationship between readability and scientific impact: Evidence from emerging technology discourses,” *Journal of Informetrics*, vol. 16, no. 1, p. 101252, Feb. 2022, doi: 10.1016/j.joi.2022.101252.