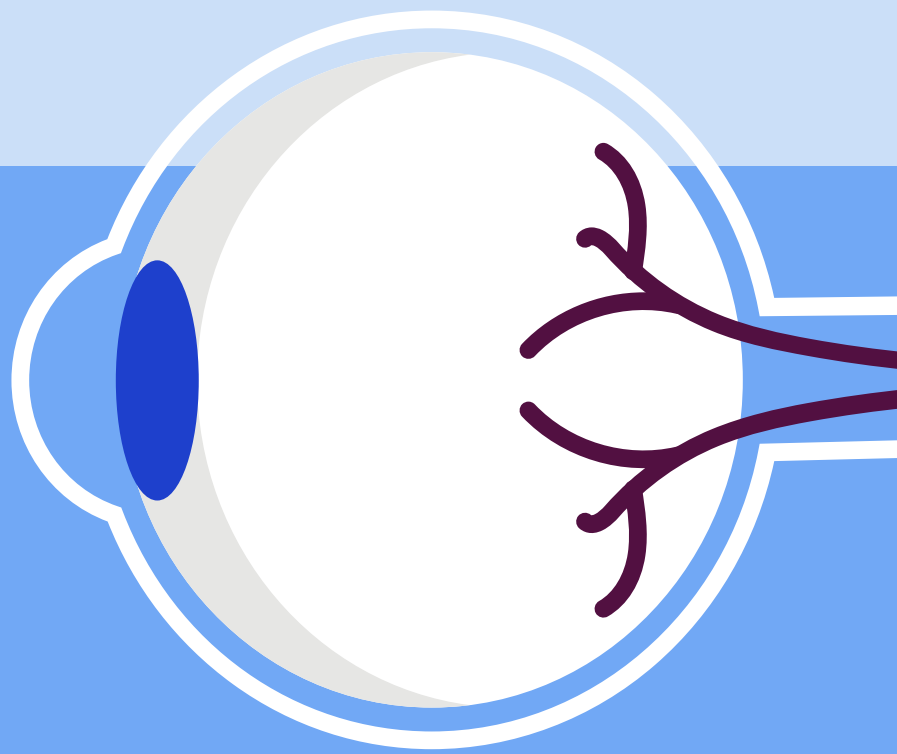# Insights into the nutritional prevention of macular degeneration based on a comparative topic modeling approach

The research introduces a Natural Language Processing algorithm for discovery acceleration by detecting topic patterns in reports that are consistent and well-distributed enough to warrant further study. This has applications for meta-analysis (demonstrated in this paper via macular degeneration studies) as well as finding structure in anecdotal reports that are often difficult to make sense of in a rigorous enough way to guide new research (future applications).

METHODS

The objective is to identify topics exhibiting distinct associations with significant results for an outcome of interest by ranking them according to their proportional occurrence in (and consistency of distribution across) reports of significant effects. Macular degeneration (MD) is a disease that affects millions of people annually, causing vision loss. Augmenting evidence synthesis to provide insight into MD prevention is therefore of central interest in this paper.

The proposed method was tested on broad-scope studies addressing whether supplemental nutritional compounds significantly benefit macular degeneration. Six compounds were identified as having a particular association with reports of significant results for benefiting MD. Four of these were further supported in terms of effectiveness upon conducting a follow-up literature search for validation (omega-3 fatty acids, copper, zeaxanthin, and nitrates). The two not supported by the follow-up literature search (niacin and molybdenum) also had scores in the lowest range under the proposed scoring system. Results therefore suggest that the proposed method's score for a given topic may be a viable proxy for its degree of association with the outcome of interest, and can be helpful in the systematic search for potentially causal relationships.
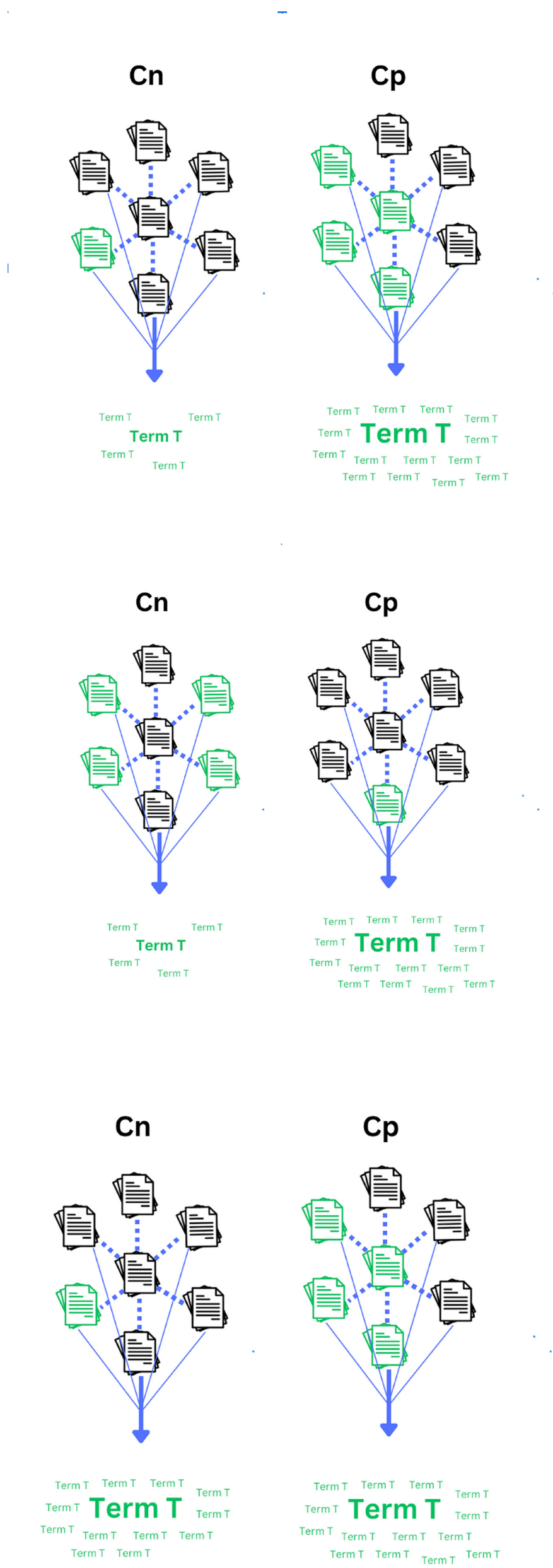
CONCLUSION

This study investigates a method to identify key topics influencing divergent study outcomes. Six nutritional compounds are found to be associated with significant results in preventing or treating macular degeneration (MD) through dietary supplementation. Upon further literature review, four of these compounds are found effective in benefiting MD. Omega-3 fatty acids, copper, zeaxanthin, and nitrates are recommended for MD supplementation. The study also reveals that compounds with lower scores in the method correlate with ineffective outcomes, indicating its practicality. Future research aims to validate this method for new inquiries and apply it to patient experiences for identifying beneficial practices warranting further study.
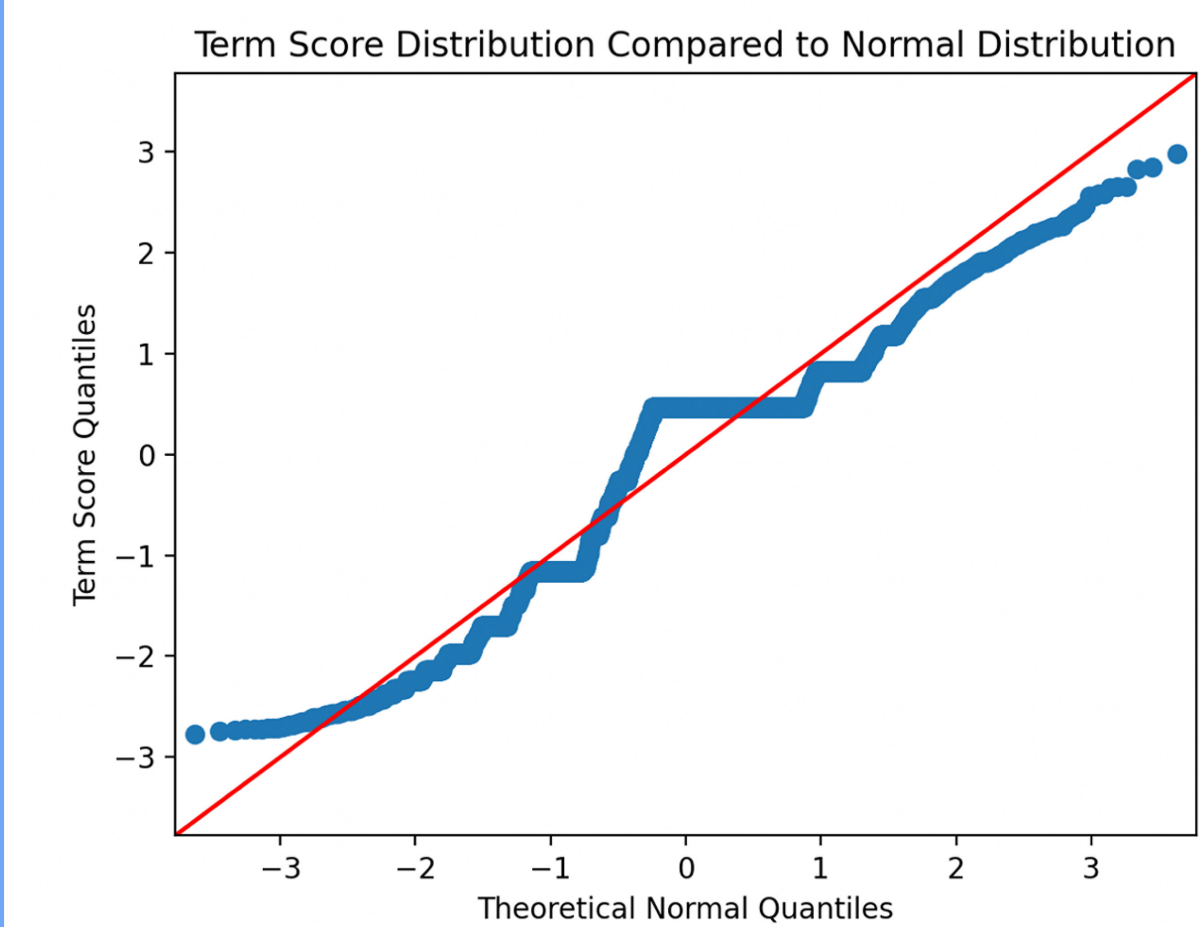
Q-Q plot of the term score distribution.

Fig. 7. A Q-Q plot of the term score distribution.