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## Effective! Unprecedented! Innovative!

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**Emotional, positive and seductive language is becoming more widespread in scientific publishing. It demands more of the reader.**



Photo: Einar Nilsen

'Nothing is more boring than reading a scientific article.' This quote is attributed to the Nobel Prize winner Francis Crick (1916–2004) (1). Most people who have struggled to stay awake late at night while reading a lengthy scientific paper would agree with him. However, it seems to be easier to stay awake now than it was before. A clear trend is emerging in scientific publishing in the use of dramatic, emotional and positively charged words. For example, an analysis of all abstracts indexed in PubMed from 1974 to 2014 found that the relative frequency of all positive words rose by 880 % during the period (2). While the increase in negative words was more modest, the relative frequency of the four positive words *robust*, *novel*, *innovative* and *unprecedented* rose by 15,000 % (2).

Similarly, a study of randomised controlled trials in orthopaedics found that subjective and hyperbolic language (hype) occurred on average 6.7 times per article, corresponding to two occurrences per 1,000 words (3). It is not just biomedicine that is being subjected to more hype: a study of 360 scientific articles from fields as diverse as electrical engineering, sociology, linguistics and biology found a consistent increase in such language from 1965 to 2015 (4). An analysis of over 2,500 research articles published in the journal *Science* over the past 25 years also showed a marked increase in the use of positively charged language (5). Likewise, research proposals are also becoming more emotional and positively charged. A study of nearly one million research grant applications to the American National Institutes of Health showed a clear increase in the use of subjective terms, promotional language and appeals to emotion from 1985 to 2020 (6). This trend accelerated in the early stages of the COVID-19 pandemic. Compared to preprint summaries published just before the pandemic, summaries about COVID-19 published in the early months of the pandemic had a significantly higher incidence of positive words, with the word *effective* being particularly common (7). Interestingly, this was partially counterbalanced by a rise in the use of modal auxiliary verbs like *can* (7), perhaps in an attempt to offset the otherwise excessively optimistic word choices?

Several factors are contributing to this trend, including the dramatic increase in the number of researchers, journals and articles. From 2014 to 2018 alone, the number of researchers worldwide rose three times faster than population growth (8), and it is estimated that over five million scientific articles are published every year (9) in more than 30,000 scientific journals globally (10). This intensifies the competition for attention, which is further fuelled by insatiable social platforms. On Facebook, there are more than half a million posts per minute, on Twitter, 6,000 tweets are posted per second and on YouTube, 500 hours of video are uploaded per minute (11).

*«In such a reality, it is not surprising that many researchers package their findings in more emotional, positive and seductive language than before»*

Some researchers argue that the 'knowledge economy' is being replaced by an 'attention economy', with attention as the most valuable currency – even in the world of science (11). While traditional scientific ranking systems like Web of

Science ranked journals, newer systems like Scopus, Orchid, Altmetrics and Google Scholar rank individual articles and researchers. When it is publication points and systems for ranking publication channels that determine positions, funding and prestige, it is essential to attract the attention of research grant providers, reviewers, editors and readers in order to be competitive. In such a reality, it is not surprising that many researchers package their findings in more emotional, positive and seductive language than before.

The phenomenon itself is far from new. Research consists of narratives, and narratives need words that give them meaning and context (12). However, seductive research rhetoric seems to be on the rise. The existence of this phenomenon does not necessarily represent a direct threat to science – as long as readers remain critical. This principle holds true even when reading an editorial as effective, unprecedented and innovative as this one.

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Publisert: 10 October 2023. *Tidsskr Nor Legeforen*. DOI: 10.4045/tidsskr.23.0653

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