

4.2 Tools for cohesion

Highlight the words and phrases that represent cohesive elements in this discussion part.

1 Our analysis of scientific abstracts demonstrates that positive and—to a lesser extent—negative words are
2 increasingly used over the past four decades. By contrast, this increase was absent for neutral and random
3 words. The increase in positive words could not be attributed to general language tendencies as represented
4 by the millions of printed books searched through in this study. Neither is the increase driven by one or two
5 words, because all words showed increased frequency patterns. Even though the upward trend in positive
6 word use was conserved in high impact journals, this trend was significantly less pronounced (fig 1 ↓). This
7 difference could be the result of a more thorough and critical editorial and peer review process in high impact
8 journals.

10 *Implications of findings*

11 Although it is possible that researchers have adopted an increasingly optimistic writing approach and are ever
12 more enthusiastic about their results, another explanation is more likely: scientists may assume that results
13 and their implications have to be exaggerated and overstated in order to get published. Our finding that
14 scientific abstracts use more overt positive language is also probably related to the emergence of a positive
15 outcome bias that currently dominates scientific literature. There is much pressure on scientists in academia to
16 publish as many papers as possible to further their careers. As a result, we may be afraid to break the bad news
17 that many studies do not result in statistically significant or clinically meaningful effects.

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19 Currently, most research findings could be false or exaggerated, and research resources are often wasted.
20 Overestimation of research findings directly impairs the ability of science to find true effects and leads to an
21 unnecessary focus on research marketability. This is supported by a recent finding that superlatives are
22 commonly used in news coverage of both approved and non-approved cancer drugs. The consequences of this
23 exaggeration are worrisome since it makes research a survival of the fittest: the person who is best able to sell
24 their results might be the most successful. It is time for a new academic culture that rewards quality over
25 quantity and stimulates researchers to revere nuance and objectivity. Despite the steady increase of
26 superlatives in science, this finding should not detract us from the fact we need bright, unique, innovative,
27 creative, and excellent scientists.