Title: **Good hype gone bad: the rise and fall of science hypes.**
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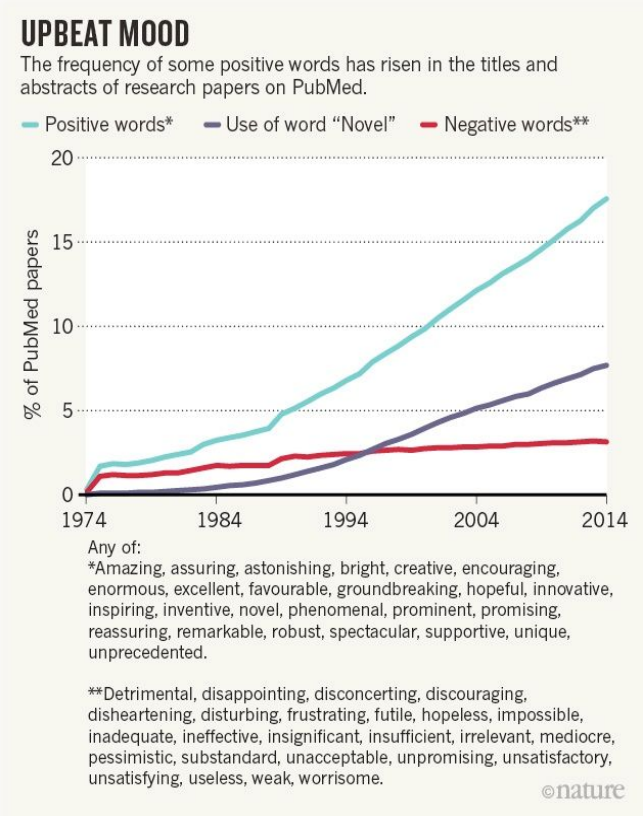
Catch phrase for twitter: The amazing, innovative, revolutionary evaluation of the hype in science including tips on turning your kitchen table into a lab bench (and why we shouldn't believe everything we read) #hypedforhype

'Novel, innovative, revolutionary', you've been seeing these words frequently on titles of academic papers, right? A team of researchers at the University Medical Center Utrecht (UMCU) identified an increase of around 20% in the frequency of positive words such as 'amazing', 'novel' and 'unprecedented' in titles and abstracts found on Pubmed over the last 40 years.[1] Concurrently there was only a minor increase on the frequency of negative words. Their research (*Fig.1*) highlights the dangerous new trend in science - "the hype". Some believe that every hype in science represents a ground-breaking project, however, oftentimes promises made in the high days of hype are difficult to follow up in the immediate research outcomes.



But, are we perhaps too quick in condemning hypes in science? Scientists inevitably follow the developments within their respective field, so the phenomenon of bio-hype and its impacts concerns mainly the general public. It's difficult to deny the profound significance bio-hypes have on public attention and consequently discourse about science. Defenders of the "bio-hype" will argue that as a hype increases public attention, there is a consequent increase in research funding and support. We've seen this already with the "ice-bucket challenge" and ALS, where the social media hype helped raise more than £5M for the research, so why not with the more basic science as well?[2] With the increase of interest and funding, new promising discoveries could be further validated, tested and developed into their full potential leading to new treatments and potentially even cures to the many conditions and illnesses that burden us. A problem arises however, when the genuine interest and hope of the public are misused by intentionally sensationalizing a discovery still in its initial stages. The unlikely increase in upbeat mood confirmed by the UMCU researchers is a symptom of the engineered hype and a pointing sign to the abuse of hype in science. As expected, Vinkers et al claim a possible explanation is the pressure on scientists to make incredible discoveries and publish in high impact journals in order to guarantee funding.[1] The fact is hype has become a real problem - although it's possible that the findings are actually expressive, scientists may assume a more aggressive position in order

to make their discoveries more marketable. This overselling can be really harmful for non-specialized people, especially those hoping for a cure that may never come.

The last decade has witnessed the development of multiple genome editing technologies. Among them is CRISPR-Cas9 which is slowly on the road to become the most recent case of the good hype gone bad. Emerging as a cheaper, more precise, as well as a faster alternative to the existing techniques, CRISPR-Cas9 has already been named “the biotech discovery of the century”.[3] To give a specific example of its capabilities, CRISPR-Cas9 has recently been successfully used to excise HIV-1 viral DNA from infected human T-cells in vitro and there are numerous groups currently testing this strategy in animal models with hopes of finding a cure for HIV.[4] However, with this, as well as other applications, what many scientists and the media ignore mentioning are the challenges of transition from the lab to the clinic. Much still remains to be done in optimizing the method’s therapeutic applications in order to ensure safety and prevent off-target effects. The overly optimistic outlook is causing the surrounding hype to balloon leading to the promotion of "kitchen-bench genetic engineering" as well as self-proclaimed DIY genome editors.[5,6] All of these further add to the build up of unrealistic expectations of CRISPR as the (immediate) cure for all diseases. While on the short term, the hype ensures more public support and funding, on the long term, the lack of "promised" results will only result in public dismissal, as well as a diminishment in the belief in science.

Although early innovations might be misused to get more public attention, it doesn’t mean new solutions shouldn’t be thought about. To overcome the bad implication of hypes, it’s crucial to adopt a realistic view of innovation, as well as embrace failure as an integral part of research. New initiatives, such as the Google-founded research-and-development facility X, endorse an innovative approach by thinking of ideas to exclude what can’t be done, a “failure-embracing” model which could benefit basic research as well.[7] Even though scientists and the media should be (and are) changing their approach to hypes, we too as the public have a responsibility to be critical and think beyond the hype.

References (all open source):

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