

Happiness matters

A collision over genes and the pursuit of happiness has attracted a large number of onlookers online.

Chris Woolston

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Every once in a while, an academic argument turns into a social-media spectacle.

In 2013, a paper concluded that a person's approach to happiness can shape gene expression (B. L. Fredrickson *et al. Proc. Natl Acad. Sci. USA* **110**, 13684–13689; 2013). The study and its first author, psychologist Barbara Fredrickson of the University of North Carolina at Chapel Hill, received [much media attention at the time](#), but a new report¹ by US and UK researchers says that the findings were “artifacts of dubious analyses and erroneous methodology”.

Stuart Ritchie, a human-intelligence researcher at the University of Edinburgh, UK, evidently enjoyed the show, as revealed by his tweet:



Altmetric

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Stuart Ritchie
@StuartJRitchie

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This demolition (by [@sTeamTraen](#)) of a "genetics of wellbeing" paper raised my wellbeing by a considerable amount:
pnas.org/content/early/...

“Ouch” tweeted [John Foxe](#), a neurologist at Albert Einstein College of Medicine in New York City, in reply.



John J. Foxe
@JohnnyFoxe

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Ouch: "statistical analyses are fatally flawed, to the point that their claimed results are in fact .. meaningless"
pnas.org/cgi/content/lo...

The 2013 paper by Fredrickson *et al.* looked at two different routes to happiness: hedonism, or the pursuit of pleasure, and eudaimonism, which the authors defined as “striving toward meaning and a noble purpose beyond simple self-gratification.” The researchers used personality questionnaires to gauge levels of hedonism and eudaimonism in 80 healthy volunteers. They also collected blood samples to measure the expression of an array of immune-system genes. The researchers concluded that the most hedonistic subjects — although they may have felt happy — showed physiological signs of stress and adversity. Compared with the eudaimonists, hedonists overexpressed genes that promote inflammation and underexpressed genes for antibody production.

The [latest paper](#) reanalysed the data in several ways. Among other things, the researchers “replaced Fredrickson *et al.*’s psychometric data with random numbers and continued to find very large numbers of apparently statistically significant effects”. The authors concluded that the original statistical analyses were “fatally flawed, to the point that their claimed results are in fact essentially meaningless”.

James Coyne, a health psychologist at University Medical Center in Groningen, the Netherlands — and a co-author on the latest study — carried the argument further in a [PLoS blog post](#). He suggested that the Fredrickson paper was an “exceptional example of the kind of nonsense, pure bunk, you can find in a prestigious journal”. He specifically queried the way that the questionnaires were scored, and offers to donate US\$100 to the American Cancer Society if the original authors “produce the unpublished analyses that justified this idiosyncratic scoring”. *PNAS* declined to comment.

Fredrickson and her co-author Steve Cole, a psychologist and bioinformatician at the University of California, Los Angeles, did not respond to *Nature*’s request for comment. However, they did [send a letter to PNAS](#) saying that the rebuttal by Coyne and colleagues was itself full of statistical missteps. They write that they have already been able to replicate the study results and that they used an “extensively validated” questionnaire and “established” scoring techniques to measure levels of hedonism and eudaimonism.

Coyne wrote in his blog post that the letter didn’t clear up his doubts. The \$100 offer, he said, still stands.

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References

1. Brown, N. J. L., MacDonald, D. A., Samanta, M. P., Friedman, H. L., & Coyne, J. C. *Proc. Natl Acad. Sci. USA* **111**, 12705–12709 (2014).