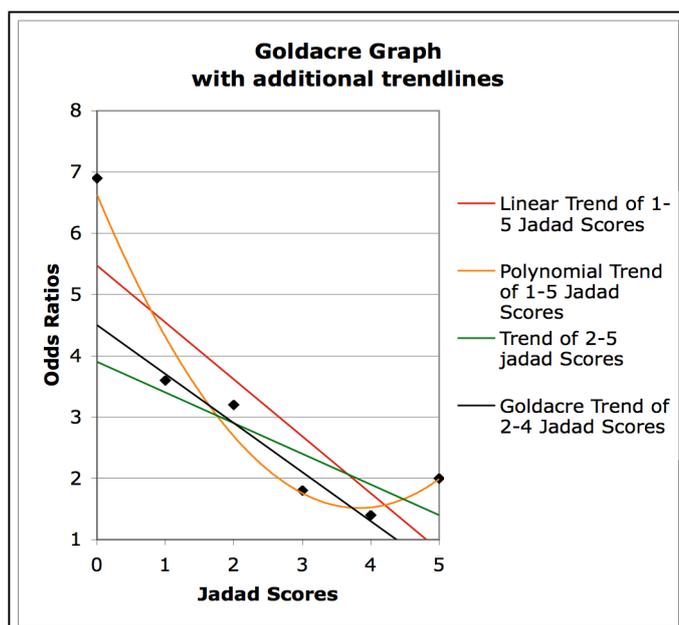


Misrepresentation of Jadad Graph



The following information relates to Ben Goldacre's book *Bad Science*,¹ which has used information from a letter by Edzard Ernst.² The relevant figures have been repeated in a *Bandolier* article³ which is freely available to the public, unlike the letter by Ernst.

Source Figures		
Quality score	Number of trials	Odds ratio
0	2	6.9 (1.5 to 31.4)
1	15	3.6 (2.1 to 6.1)
2	32	3.2 (2.3 to 4.6)
3	19	1.8 (1.4 to 2.3)
4	11	1.4 (1.0 to 2.0)
5	10	2.0 (1.4 to 2.9)

The graph to the left is based on the figures in the table above.

In the graph the **red** trendline is the one which includes all the odds ratios.

The **black** trendline is the one used in *Bad Science* and this is directly attributed to Ernst. Analysis of the figures, however, reveals that it does not take account of all the odds ratios, but *excludes* those for Jadad scores 0 and 5. This fact is not pointed up by Goldacre, though a subsequent quotation from Ernst confirms it:

“The correlation provided by the four datapoints (Jadad score 1–4) roughly reflects the truth. Extrapolation of this correlation would lead them to expect that those trials with the least room for bias (Jadad score = 5) show that homeopathic remedies are pure placebos.” (p. 54)

As a result, when Goldacre says of this trendline that “... as the Jadad score tends to the top mark of 5, as the trials become more of a ‘fair test’, the line tends towards showing that homeopathy performs no better than placebo” (p. 53), the assumption by a reader is that the line represents the trend for all the odds ratios. This is reinforced by the close correlation with the odds ratios it does represent.

On the basis of this trendline, Goldacre then calls the odds ratio for the Jadad score of 5 an “anomalous” result, when it is actually a result which has been *excluded* from the trend with which it is being compared.

If excluding the best trials from an analysis of the trend seems perverse, the explanation comes in other statements by Ernst and Goldacre. In Goldacre's quotation from Ernst, the sentence immediately preceding the passage above suggests that “Scientists who insist that homeopathic remedies are in every way identical to placebos might favour the following.” (p. 54). In other words, the selection of those data points (Jadad scores 1-4) is *deliberately* based on an opinion that homeopathic treatment is only a placebo, and is not intended to offer a true analysis of the data.

Goldacre himself ignores this admission of bias in the presentation of the data, perhaps because it is his own view, since he states in the introduction to *Bad Science*: “homeopathy pills are, after all, empty little sugar pills which seem to work, and they embody everything you need to know about ‘fair tests’ of a treatment” (pp. x-xi). As a result he concludes from Ernst's interpretation that “some of the papers making up that spot are a stitch-up. I don't know which ones, how it happened, or who did it, in which of the ten papers, but that's what I think.” (p. 53). At this point Goldacre, a vehement supporter of evidence-based medicine, rejects objective evidence in favour of an unsupported personal opinion.

However, if the odds ratio for the Jadad score of 5 is included it produces the **green** trendline, and this is based on results which diverge significantly to both sides of the trend. As such, it also indicates that there is a need to consider closely the odds ratios for Jadad scores 3 and 4, since there is stronger linearity between the

¹ Ben Goldacre, *Bad Science* (London: Fourth Estate, 2008), p. 53.

² E. Ernst and M.H. Pittler, ‘Re-analysis of previous meta-analysis of clinical trials of homeopathy’, *Journal of Clinical Epidemiology*, 53 (2000), 11.

³ *Bandolier* website at <<http://www.medicine.ox.ac.uk/bandolier/booth/alternat/homequal.html>>.

other three results. Furthermore, it could be argued that this trendline is the most relevant, as it excludes only 2 trials, and those with a Jadad score of zero.

If one is going to select data in this way, a trendline (not included here) could be justified based on only the higher quality trials (Jadad Score 3 or above), and this shows that the better the trials, the greater the effect of homeopathic treatment over placebo.

Finally, the **orange** trendline reflects a different approach. The principles used in testing pharmaceuticals are not simply transferable to testing homeopathic treatment, since homeopathy has its own principles determining what can be treated, what treatment or treatments are needed, and what constitutes a positive outcome. Thus:

- Researchers with experience of homeopathy, but little of pharmaceutical protocols are liable to fail to meet the Jadad requirements, but be successful in treating patients.
- Researchers with pharmaceutical experience, but little knowledge of homeopathy are liable to compromise homeopathic principles and reduce the possibility of the treatment being effective.
- The best researchers will gradually tend to meet both requirements fully.

So if homeopathy is more effective than placebo, then the issue of two conflicting requirements will lead to the increasing likelihood that the *best quality* trials will be the first to show its effectiveness, simply because they reflect the work of better researchers. The very close correlation of the odds ratios with a quadratic curve suggests that this is what is happening.