

## 'Antifragility' as a mathematical idea

In his review of my book *Antifragile*, Michael Shermer mischaracterizes the concept of 'antifragility' (*Nature* **491**, 523; 2012).

'Fragility' can be defined as an accelerating sensitivity to a harmful stressor: this response plots as a concave curve and mathematically culminates in more harm than benefit from random events. 'Antifragility' is the opposite, producing a convex response that leads to more benefit than harm.

We do not need to know the history and statistics of an item to measure its fragility or antifragility, or to be able to predict rare and random ('black swan') events. All we need is to be able to assess whether the item is accelerating towards harm or benefit. The relation of fragility, convexity and sensitivity to disorder is thus mathematical (N. N. Taleb and R. Douady *Quant. Finance*, in the press) and not derived from empirical data, as Shermer implies.

Shermer's suggestion that I should offer "a checklist of things companies or countries can do to prepare for black-swan events" overlooks 50 or so such heuristics based on the identification of convex responses.

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