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Neuroskeptic

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# The Nine Circles of Scientific Hell

## Neuroskeptic<sup>1</sup>

In the spirit of Dante Alighieri's *Inferno*, this paper takes a humorous look at the fate that awaits scientists who sin against best practice.

The *Divine Comedy* of Dante Alighieri is a classic of world literature and was the first major work in the Italian language. In the first book of the trilogy, *Inferno*, Dante offers a tour of the nine increasingly horrible levels of Hell, in which the wicked are tormented forever in ways corresponding to their sins. But Dante lived before the era of modern science. Perhaps it is necessary to update his scheme to explain what happens to those guilty of various scientific sins, ranging from the commonplace to the shocking (see Fig. 1.).

Dante's Hell had a place for everyone, and it was only Christ's intervention that saved anyone from it; even "good" people went to Hell, because everyone sinned, and sins were still sins however ubiquitous they were. Likewise, very few scientists (the author is certainly not one of them) would be able to avoid being condemned to some level of this Inferno... but is that an excuse?

### First Circle: Limbo

The uppermost circle is not a place of punishment so much as regret. Those who have committed no scientific sins per se, but who have turned a blind eye to them, or encouraged sinners through the awarding of grants, spend eternity on top of this barren mountain, watching the carnage below and reflecting on how they are partially responsible...

### Second Circle: Overselling

This circle is reserved for those who exaggerated the importance of their work in order to get grants or write better papers. Sinners are trapped in a huge pit, up to their necks in horrible sludge. Each sinner is provided with the single rung of a ladder, labeled "The Way Out—Scientists Crack Problem of Second Circle of Hell."

### Third Circle: Post-Hoc Storytelling

Sinners condemned to this circle must constantly dodge the attacks of demons armed with bows and arrows, firing more or less at random. Every time someone is hit in some part of their body, a demon proceeds to explain at length that it was aiming for that exact spot all along.

### Fourth Circle: $p$ Value Fishing

Those who tried every statistical test in the book until they got a  $p$  value less than .05 find themselves here, in an enormous lake of murky water. Sinners sit on boats and must fish for their food. Fortunately, they have a huge selection of different fishing rods and nets (brand names include Bayes, Student, Spearman, and many more). Unfortunately, only one in 20 fish are edible, so the sinners in this circle are constantly hungry.

### Fifth Circle: Creative Use of Outliers

Those who "cleaned up" their results by excluding inconvenient data points are condemned here. Demons pluck out their hairs one by one, each time explaining that the sinner is better off without that hair, because there was something wrong with it.

### Sixth Circle: Plagiarism

This circle is empty because as soon as sinners arrive, a demon carries them to another circle and forces them to suffer the punishment meted out to the people there. After their 3-year "post" is up, they are carried to another circle, and so on...

### Seventh Circle: Nonpublication of Data

Here, sinners are chained to burning chairs in front of desks covered with broken typewriters. Only if the sinners can write an article describing their predicament will they be set free. Each desk has a file drawer stuffed full of these articles, but the drawers are locked.

### Eighth Circle: Partial Publication of Data

At any given time, exactly half of the sinners here are chased around by demons prodding them with spears. The demons choose which group to chase at random, after ensuring that the groups are matched for age, gender, height, and weight. Howling winds fill the air with a constant torrent of articles announcing the success of a new program to enhance participation in physical exercise—but with no mention of the side effects.

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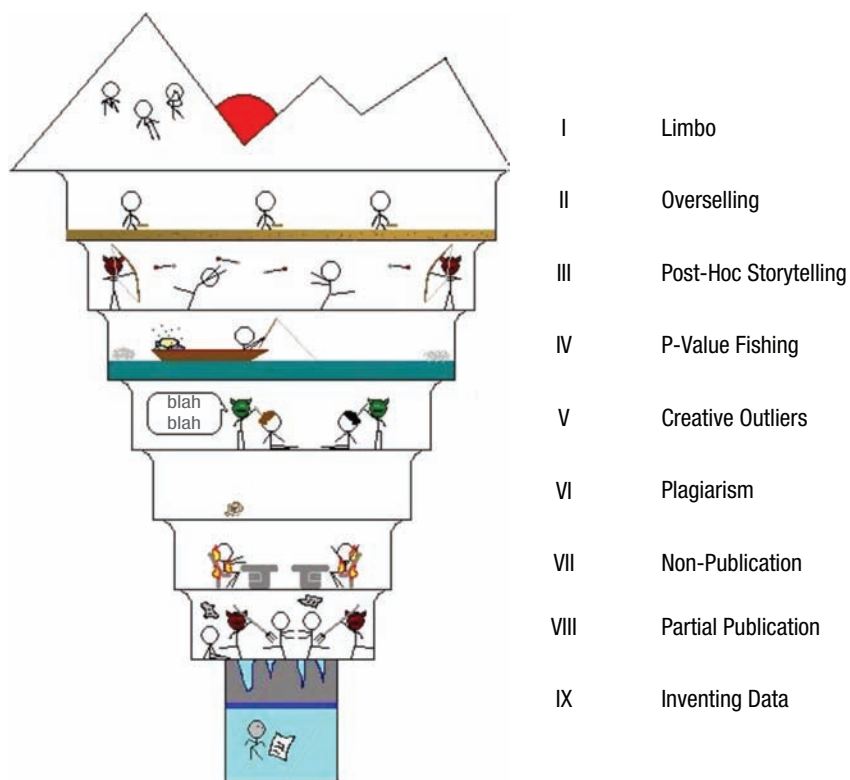


Fig. 1. The nine circles of scientific hell (with apologies to Dante and xkcd)

## Ninth Circle: Inventing Data

Here, Satan himself lies trapped forever in a block of solid ice alongside the worst sinners of all. Frozen in front of their eyes is a paper explaining very convincingly that water cannot freeze in the environmental conditions of this part of Hell. Unfortunately, the data were made up.

## Notes

1. This article is adapted from a post originally published on the Neuroskeptic blog on November 9, 2010: <http://neuroskeptic.blogspot.com/2010/11/9-circles-of-scientific-hell.html>