Week 1 lecture notes - PSYC 5301

Jan 21, 2017

Philosophical underpinnings

The goal of research is to find the **one truth**. . . however, the **paths are many**. Let's see how an ancient Hindu text can actually serve as a metaphor for how we do science.

Three paths to enlightenment (Bhagavad Gita, 500 BCE):

1. Karma yoga - the path of *action*

2. Jnana yoga - path of *knowledge*

3. Bhakti yoga - path of *devotion*

These map nicely onto Royall's (1997) three questions one should ask regarding data:

1. What should I do?

2. What's the relative evidence?

3. What should I believe?

Paths for research:

1. **Path of action**: search for rules to govern our behavior such that, in the long run, we will not be wrong too often

   - $p < \alpha$: reject H_0
   - $p > \alpha$: remain in doubt
   - A rule to govern our *behavior* in the *long run*. It tells us *nothing* about the *current test*.

2. **Path of knowledge**: compare the likelihood of different hypotheses, given the data.

- suppose you flip a coin 10 times: you get 6 heads and 4 tails. Is the coin biased (unfair)?
- Two hypotheses:
    - H_1: the coin is biased (the true proportion of heads/tails is 0.6
    - H_2: the coin is fair (true proportion of heads/tails is 0.5
    - Question: given the data, how much more likely is H_1 than H_2

likelihood = 0.251

likelihood = 0.205

likelihood ratio = 1.22

likelihood

true proportion