**Class exercise**

**Bayesian Models in Psychology**

1. Suppose you have conducted a study to test a hypothesis, e.g. that mindfulness training can significantly increase intelligence.
2. You have tested differences in intelligence between participants who took part in mindfulness training and a control group.
3. You decided to use standard NHST, and thus to reject hypothesis of no difference if *p* < .05.
   1. This means that Pr(positive test difference | no true difference) = .05, and Pr(no test difference | no true difference) = .95.
4. Your study has a power of .80.
   1. This means that Pr(positive test difference | true difference) = .80, and Pr(no test difference | true difference) = .20.
5. Further, suppose that true hypotheses are rare, e.g. only 1 in 100 hypotheses turns out to be true.
   1. This means that Pr(true difference) = .01 and Pr(no true difference) = .99.
6. How likely is your hypothesis given that your statistical test rejected hypothesis of no difference, i.e. find Pr(true difference | positive test difference

Pr(true difference | positive test difference) = Pr(positive test difference | true difference) \* Pr(true difference) / Pr(positive test difference)

Pr(true difference | positive test difference) = .80 \* .01 / Pr(positive test difference)

Pr(positive test difference) = [Pr(positive test difference | true difference) \* Pr(true difference] + [Pr(positive test difference | no true difference) \* Pr( no true difference)]

Pr(positive test difference) = [.80 \* .01] + [.05 \* .99] = .0575

Pr(true difference | positive test difference) = .80 \* .01 / .0575 = .139

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