Errors in 2018 2nd Edition

Last updated 20 November 2020

Page 20 To be consistent with the full example in Chapter 12 (which we also need to update – see below) we need to change the text of the two bullet points near the bottom of the page as follows:

- For drug Precision the mean weight loss for 100 subjects is 0.5 lbs with sample standard deviation 2
- For drug Oomph the mean weight loss for 100 subjects is 1.5 lbs with sample standard deviation 6

Page 21 Figure 2.15 there should be no arrow connecting Height to Intelligence

Page 34 The numbers in the example relating to absolute versus relative risk for mouth cancer are wrong. They should be as follows:

> Assume 500,000 deaths per year in the UK of which 84 are from mouth cancer. Assume 20% of those who died were 'wine drinkers' and that the mouth cancer deaths in each of the two categories were:

	Mouth cancer deaths	% deaths from mouth cancer
Wine drinkers (100,000)	36	0.036%
Non-wine drinkers (400,000)	48	0.012%

> So, the relative risk is tripled (from 0.012% to 0.036%) but the absolute risk only increases 0.024%

Page 40 Figure 1.27 should be Figure 2.27 (thanks to Omar Verduga for pointing that out)

Pag 68, Box 4.1 4th paragraph:

> "… our probabilities represent **casual** mechanisms..."

should be

> "… our probabilities represent **causal** mechanisms..."

Page 153 Table 6.4 $P(data) = 0.168756$ and so the denominator used in the calculation of the posterior is equal to 0.168756 rather than 0.08257. The Posterior result shown in the table is correct despite this error.

Page 157 Figure (7.1) lower case "p" should be replaced with upper case "P" i.e.

$$P(T = True \mid N = True) = \frac{P(N = True \mid T = True)P(T = True)}{P(N = True)}$$

Page 160 Box 7.1 Part 2. Refers to Theorem 4.1 when it should refer to Theorem 5.1.

Page 385-386. Example 12.2 This entire example should be replaced with the following.

Consider the hypothesis *H*:

***H**:* "People taking the drug lose weight over a 6-month period"

Null hypothesis (not H): "People taking the drug lose no weight over a 6-month period"

D: We observe 100 people using the drug. The average (mean) weight loss is 0.5 lb and the sample standard deviation 2.05. The *standard deviation of the mean* is then calculated as

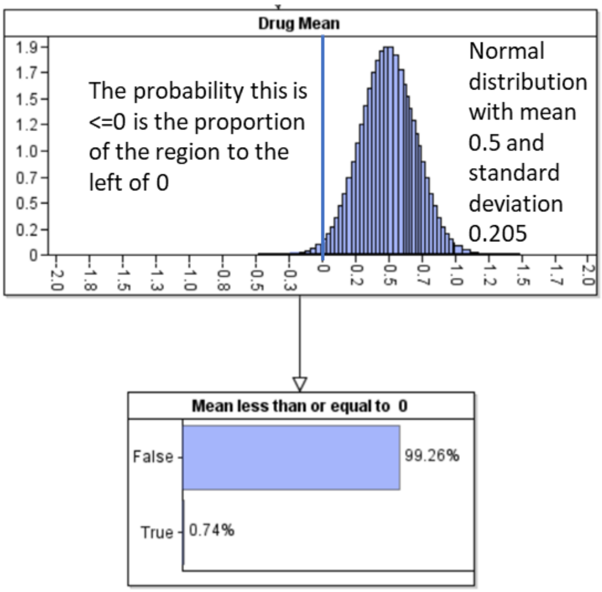
$$\frac{\text{sample standard deviation}}{\sqrt{\text{sample size}}} = \frac{2.05}{10} = 0.205$$

Providing (as in the case) that the sample size is at least 30, the 'classic' way to estimate P(D | not H) is to:

1. Assume the (true) *mean weight loss* has a Normal distribution whose mean is 0.5 and standard deviation 0.205
2. Then calculate the probability that this distribution is less than or equal to zero

Using standard tables, excel or AgenaRisk you can see in this case that the probability (which is also called the p-value) is 0.0074, i.e. 0.74%

As the p-value < 1% we reject the null hypothesis at the 1% p-value level – and hence 'accept' that there is 'significant' support for H.



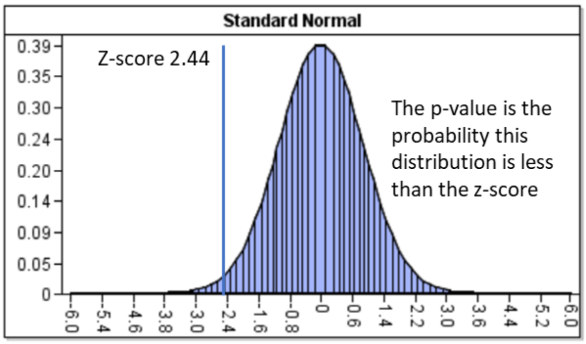
In the old days it was necessary to ‘transform’ the particular Normal distribution into a ‘standard Normal distribution’ (one with mean 0 and standard deviation 1) in order to calculate the p-value because – in the absence of computers – people relied on tables that had the standard normal distribution.

To do the transformation we calculate what is called the z-score:

$$z = \frac{\text{sample mean } - \text{null hypothesis mean}}{\text{standard deviation of mean}} \quad = \frac{0.5-0}{0.205} = 2.44$$

This z-score is the distance from the mean of the ‘standard Normal distribution’ (one with mean 0 and standard deviation 1). The p-value – which is exactly equivalent to the p-value 0.0074 we previously calculated is equal to the probability that the distribution is less than the z-score.

Tables of standardized Z-scores show that any value above 2.326 has a probability less than 1% - so we can reject the null hypothesis at the 1% level.



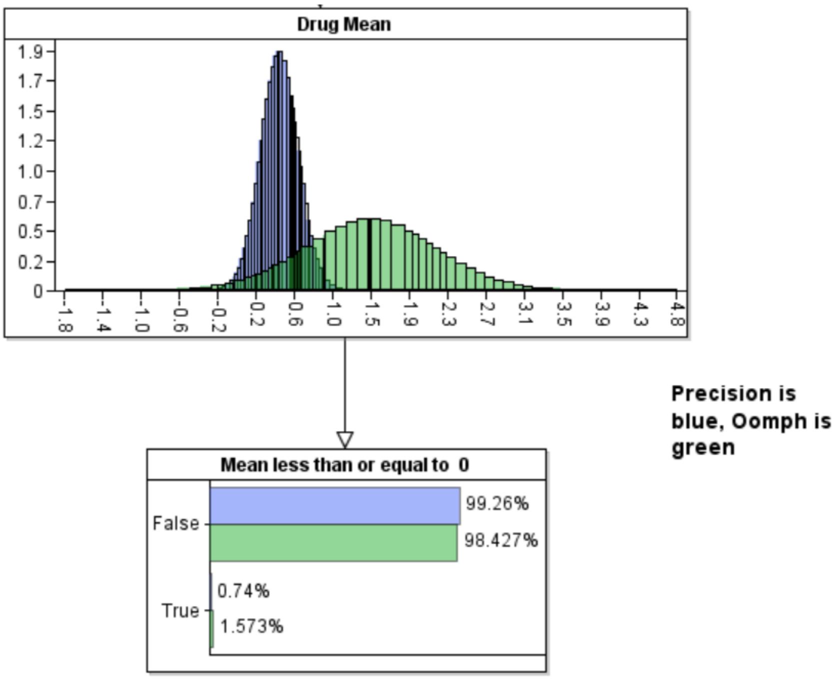
So now we ask: which of the following two weight loss drugs is best?

Precision*:* the mean weight loss for 100 subjects is 0.5 lbs with sample standard deviation 2.05 (so standard deviation of mean is 0.205)

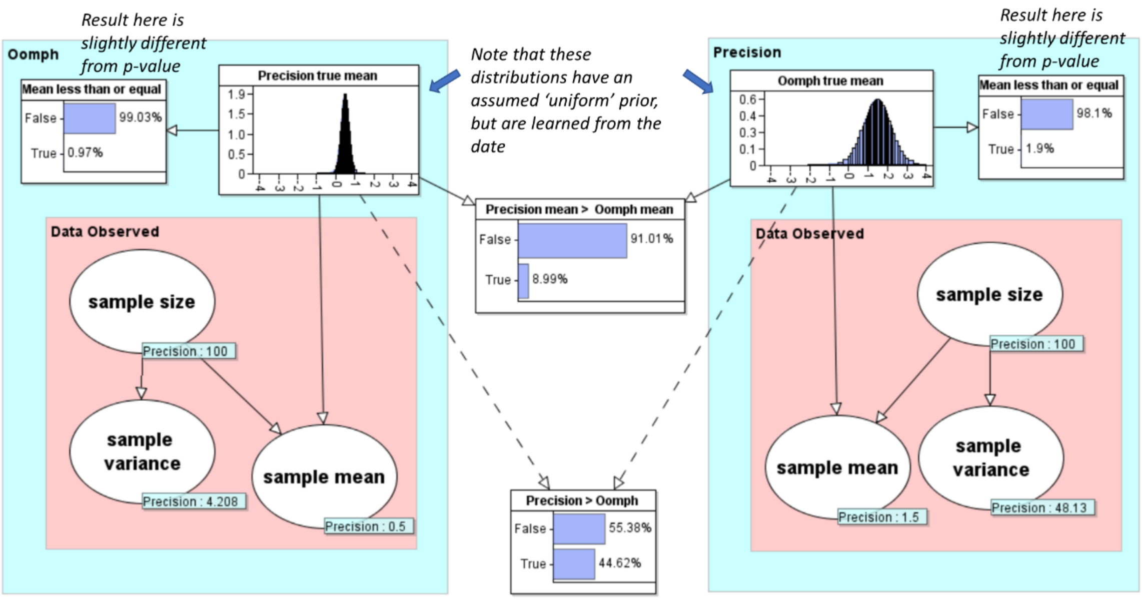
Z-score 2.44, p-value essentially 0.0074 (i.e. 0.74%). **Null hypothesis rejected at 1%**

Oomph*:* the mean weight loss for 100 subjects is 1.5 lbs with sample standard deviation 6.97 (so standard deviation of mean is 0.697)

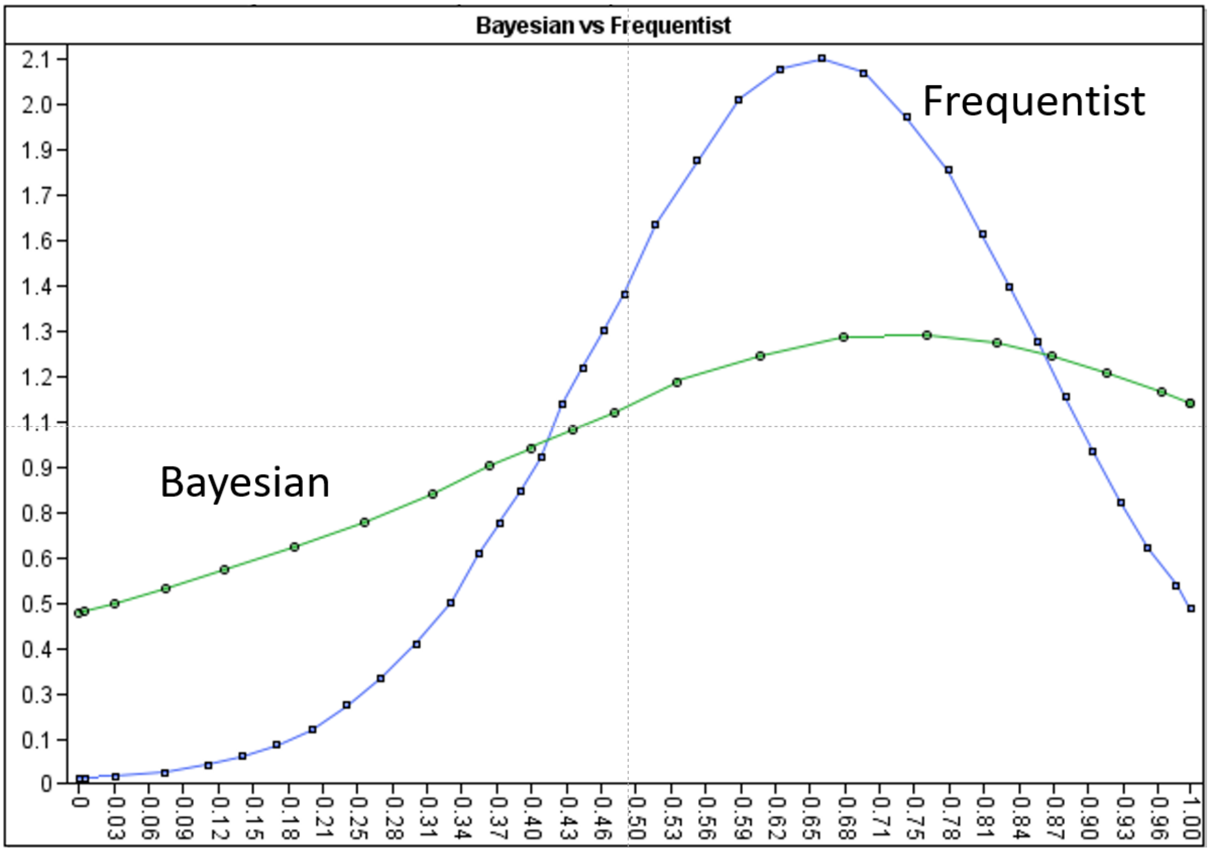
Z-score 2.15, p-value 0.016 (i.e. 1.6%). **Null hypothesis NOT rejected at 1%**



The full BN model to determine which is 'best':



Page 326 Figure 10.25 should be replaced with:



Page 427 Example 13.1 $P(Collision) = 0.01 \times 0.1 \times 0.1 \times 0.5 \times 0.5 = 0.000025$

Page 467 penultimate paragraph replace "….to have even high reliability…." with "….to have even higher reliability…".