Notes explaining code in powerJMP

The code demonstrates using Excel as a calculator to implement the examples in the week 2 notes

The week 2 notes have 3 examples using the fundamental power equation. We use Excel to calculate what we need and any intermediate quantities.

1) How big a difference is needed to get 80% power when n = 20 per group and s = 5?

This question provides you 1-β ( = 0.8), s (=5), and n (=20).

The type I error is not specified, so we’ll use α = 0.05 by default.

We need to find δ, the true difference.

The problem specifications are entered in row 7: values of power, n, s, and alpha

Row 10 contains intermediate computations: 1-α/2, df and the se of the difference.

Row 13 contains the result (delta).

Cells B10-D10 compute the necessary intermediate values. Note: D10 is the se for a 2-sample difference of means.

Cell B13 computes delta using the formula from the notes.

2) What n is needed for 80% power to detect a difference of 2 when s = 14.8?

As explained in class, the best way to implement this is to use an iterative calculation.

You specify a starting value of n in cell B20. That is used to compute the df. 1-α/2 is also calculated, because it’s needed for one of the quantiles.

Cell B21 does the hard work: Computing the new n given delta and s (from row 17) and the initial df (based on n = 31) and 1-α/2. The new df (Cell C21) is then calculated.

To iterate the calculations, copy row 21 into row 22. You see the newest n and associated df. If n doesn’t change much, you’re done. If it does, copy row 22 into row 23 to iterate one more time.

3) What is the power given n, delta and s?

This computation is implemented in essentially the same way as the first one. Intermediate quantities are computed on row 29. Tb is the quantile associated with the power. We need to calculate the probability associated with that quantile. That’s the T.DIST() function, explained by the quantileJMP document.