

Each function is written as closely as possible to the code in the book, variable names are the same where possible and the basic structure is maintained. Each function has an appropriate name and an example of how to call it with test data from the book. Page references for the data are given. One extra function, the 2x2 cross classification calculated as a ratio of odds is given as well as that calculated from probabilities, this is derived from the similar code on the webpage.

[http://www.lifesci.sussex.ac.uk/home/Zoltan\\_Dienes/inference/Likelihood.htm](http://www.lifesci.sussex.ac.uk/home/Zoltan_Dienes/inference/Likelihood.htm).

Headings match those in the book.

## Appendix A Program for Proportion

The test data from figure 5.3 p131 and is 14 successes and 6 failures and called by

```
> propDienes(14,6)
```

should give

```
$thetamax = 0.7  
$begin8 = 0.475  
$end8 = 0.874  
$begin32 = 0.409  
$end32 = 0.909
```

If the function is called with a target you should get no output but the values can be seen or used, for example

```
> temp<-propDienes(14,6)  
> temp$thetamax  
[1] 0.7
```

## Appendix B Program for 2x2 cross classification

The test data from figure 5.4 p 135 is

	Preferred meditating on giving	Preferred empty mind meditation
Poor Imagery	5	10
Vivid Imagery	14	6

Called by

```
> cross2x2(5,10,14,6,.4,.6)
```

should give

```
$gammamax = 0.46
```

```
$begin8 = 0.18
$end8 = 0.94
$begin32 = 0.12
$end32 = 1.14
$likelihoodratio = 0.1551490
```

the alternative version using odds ratio is called by

```
> cross2x2_odds(5,10,14,6,.4, .6)
```

with output

```
$psimax = 0.23
$begin8 = 0.05
$end8 = 0.94
$begin32 = 0.03
$end32 = 1.4
$likelihoodratio = 1.907014
```

### **C Program for mean of normal with unknown variance**

The test data is on page 138,

Sample standard error = 1.2

Sample mean = 1.9

Number of subjects = 30

Population mean assumed by first hypothesis = 0

Population mean assumed by second hypothesis = 3

Called by

```
> meanUV(1.2, 1.9, 30, 0, 3)
```

Should give

```
$begin8 = -0.68
$end8 = 4.492
$begin32 = -1.52
$end32 = 5.332
$likelihoodratio = 0.4707979
```

### **D Program for between-subjects contrasts**

The test data is in Box 3.7 p 74-5

	Romance	Science fiction
Males	5 (1.5)	8 (2.1)
Females	9 (1.7)	7 (1.9)

Giving  $C = -5$ ,  $SD_p = 1.81$  and degrees of freedom 76

Called by

```
> contrast(1.81, -5, 76, 0, -5)
```

Should give

```
$begin8 = -8.7105  
$end8 = -1.2714  
$begin32 = -9.8327  
$end32 = -0.1492  
$likelihoodratio = 0.02528494
```

### **The Bayes factors program from the text p118-9**

The test data can be found starting at p100.

```
sd = 1.09  
obtained = -2.8  
upper = 0  
lower = -600  
meanoftheory = 0  
sdtheory = 2
```

This is a more complex function and can be called in two ways. The function definition is

```
Bf(sd, obtained, uniform, lower=0, upper=1, meanoftheory=0,  
sdtheory=1, tail=2)
```

and it can be called in several ways

```
Bf(sd, obtained, uniform, lower, upper)
```

where `uniform = 1`, calls the function to calculate a Bayes factor assuming that the distribution of  $p(\text{population value} \mid \text{theory})$  is uniform.

So called by

```
> Bf(1.09, -2.8, 1, lower = -600, upper = 0)
```

Should give

```
$LikelihoodTheory = 0.00166435  
$Likelihoodnull = 0.01350761  
$BayesFactor = 0.1232157
```

Note: the last two parameters **must** be named.

```
Bf_Dienes(sd, obtained, uniform, meanoftheory, sdtheory, tail)
```

where `uniform = 0` and `tail = 1`, calls the function to calculate a Bayes factor

assuming that the distribution of  $p(\text{population value} \mid \text{theory})$  is non uniform and the distribution is one-tailed (tail = 2 obviously giving two-tailed).

Note: the last three parameters **must** be named.

So called by

```
> Bf(1.09, -2.8, 0, meanoftheory =0, sdtheory =2, tail =1)
```

Should give

```
$LikelihoodTheory = 0.001955743  
$Likelihoodnull = 0.01350761  
$BayesFactor = 0.1447882.
```

Called by

```
> Bf(1.09, -2.8, 0, meanoftheory =0, sdtheory =2, tail =2)
```

Should give

```
$LikelihoodTheory = 0.08227421  
$Likelihoodnull = 0.01350761  
$BayesFactor = 6.090951
```