Exp 2 of 4

October 1, 2016

Contents

1 Get the data

```
source("e2-preprocessing.R")
if (!file.exists("e2-b-data.txt")) {
    dat <- gatherData()
    dat <- declareImpossibleRT(dat)
    dat <- removeImpossibleTrials(dat)
    dat <- subset(dat, select = c(Subject, Trial, Item, discriminability, Instruction, nchar_instr, Vagueness,
        Number, Order, Quantity, c_Vag, c_Num, c_Ord, c_Qty, NaType, response_category, isBorderline,
        RT))
    write.table(dat, file = "e2-b-data.txt", sep = "\t", quote = FALSE)
}
dat <- read.delim("e2-b-data.txt")
dd <- read.delim("e2-b-data.txt")
```

```r
names(dd)
```

```
 [1] "Subject"           "Trial"             "Item"              "discriminability"
 [5] "Instruction"       "nchar_instr"       "Vagueness"         "Number"
 [9] "Order"             "Quantity"          "c_Vag"             "c_Num"
[13] "c_Ord"             "c_Qty"             "NaType"            "response_category"
[17] "isBorderline"      "RT"
```

```
head(dd)
```

```
  Subject Trial     Item discriminability                           Instruction nchar_instr
1     s01     1 06:15:24        0.4875000          Choose the square with 6 dots          29
2     s01     2 16:25:34        0.3123529     Choose a square with about 30 dots          34
3     s01     3 26:35:44        0.2308442 Choose the square with the fewest dots          38
4     s01     4 36:45:54        0.1833333     Choose a square with about 50 dots          34
5     s01     5 06:15:24        0.4875000     Choose a square with about 10 dots          34
6     s01     6 16:25:34        0.3123529         Choose a square with many dots          30
  Vagueness  Number Order Quantity c_Vag c_Num c_Ord c_Qty      NaType response_category
1     Crisp Numeric  RtoL    Small  -0.5  -0.5   0.5  -0.5 valid_trial          expected
2     Vague Numeric  LtoR    Large   0.5  -0.5  -0.5   0.5 valid_trial        borderline
3     Crisp  Verbal  LtoR    Small  -0.5   0.5  -0.5  -0.5 valid_trial          expected
4     Vague Numeric  RtoL    Large   0.5  -0.5   0.5   0.5 valid_trial        borderline
5     Vague Numeric  RtoL    Small   0.5  -0.5   0.5  -0.5 valid_trial          expected
6     Vague  Verbal  LtoR    Large   0.5   0.5  -0.5   0.5 valid_trial          expected
  isBorderline   RT
1        FALSE 1517
2         TRUE 1920
3        FALSE 2346
4         TRUE 1773
5        FALSE 2556
6        FALSE 2043
```

```
summary(dd)
```

```
   Subject         Trial             Item      discriminability
s01    : 256   Min.   :  1.0   06:15:24:1919   Min.   :0.1833
s02    : 256   1st Qu.: 65.0   16:25:34:1919   1st Qu.:0.2308
s03    : 256   Median :129.0   26:35:44:1920   Median :0.2308
s04    : 256   Mean   :128.5   36:45:54:1919   Mean   :0.3035
s05    : 256   3rd Qu.:193.0                   3rd Qu.:0.3124
s06    : 256   Max.   :256.0                   Max.   :0.4875
(Other):6141
                               Instruction    nchar_instr    Vagueness        Number
Choose a square with few dots         : 960   Min.   :29.00   Crisp:3840   Numeric:3838
Choose the square with the fewest dots: 960   1st Qu.:30.00   Vague:3837   Verbal :3839
Choose the square with the most dots  : 960   Median :30.00
Choose a square with many dots        : 959   Mean   :32.59
Choose a square with about 30 dots    : 480   3rd Qu.:36.00
Choose a square with about 40 dots    : 480   Max.   :38.00
(Other)                               :2878
 Order       Quantity        c_Vag               c_Num              c_Ord
LtoR:3838   Large:3837   Min.   :-0.5000000   Min.   :-5.00e-01   Min.   :-5.00e-01
RtoL:3839   Small:3840   1st Qu.:-0.5000000   1st Qu.:-5.00e-01   1st Qu.:-5.00e-01
                         Median :-0.5000000   Median : 5.00e-01   Median : 5.00e-01
                         Mean   :-0.0001954   Mean   : 6.51e-05   Mean   : 6.51e-05
                         3rd Qu.: 0.5000000   3rd Qu.: 5.00e-01   3rd Qu.: 5.00e-01
                         Max.   : 0.5000000   Max.   : 5.00e-01   Max.   : 5.00e-01

     c_Qty                    NaType      response_category isBorderline          RT
Min.   :-0.5000000   valid_trial:7677   borderline:1274    Mode :logical   Min.   :  445
1st Qu.:-0.5000000                      expected  :6108    FALSE:6403      1st Qu.: 1240
Median :-0.5000000                      extreme   : 295    TRUE :1274      Median : 1727
Mean   :-0.0001954                                         NA's :0         Mean   : 2840
3rd Qu.: 0.5000000                                                         3rd Qu.: 2699
Max.   : 0.5000000                                                         Max.   :42685
```

```
str(dd)

'data.frame': 7677 obs. of  18 variables:
 $ Subject          : Factor w/ 30 levels "s01","s02","s03",..: 1 1 1 1 1 1 1 1 1 1 ...
 $ Trial            : int  1 2 3 4 5 6 7 8 9 10 ...
 $ Item             : Factor w/ 4 levels "06:15:24","16:25:34",..: 1 2 3 4 1 2 3 4 1 2 ...
 $ discriminability : num  0.487 0.312 0.231 0.183 0.487 ...
 $ Instruction      : Factor w/ 17 levels "Choose a square with about 10 dots",..: 15 3 16 5 1 7 6 16 17 11 ...
 $ nchar_instr      : int  29 34 38 34 34 30 29 38 36 30 ...
 $ Vagueness        : Factor w/ 2 levels "Crisp","Vague": 1 2 1 2 2 2 2 1 1 1 ...
 $ Number           : Factor w/ 2 levels "Numeric","Verbal": 1 1 2 1 1 2 2 2 2 1 ...
 $ Order            : Factor w/ 2 levels "LtoR","RtoL": 2 1 1 2 2 1 2 2 1 2 ...
 $ Quantity         : Factor w/ 2 levels "Large","Small": 2 1 2 1 2 1 2 2 1 1 ...
 $ c_Vag            : num  -0.5 0.5 -0.5 0.5 0.5 0.5 0.5 -0.5 -0.5 -0.5 ...
 $ c_Num            : num  -0.5 -0.5 0.5 -0.5 -0.5 0.5 0.5 0.5 0.5 -0.5 ...
 $ c_Ord            : num  0.5 -0.5 -0.5 0.5 0.5 -0.5 0.5 0.5 -0.5 0.5 ...
 $ c_Qty            : num  -0.5 0.5 -0.5 0.5 -0.5 0.5 -0.5 -0.5 0.5 0.5 ...
 $ NaType           : Factor w/ 1 level "valid_trial": 1 1 1 1 1 1 1 1 1 1 ...
 $ response_category: Factor w/ 3 levels "borderline","expected",..: 2 1 2 1 2 2 2 2 2 1 ...
 $ isBorderline     : logi  FALSE TRUE FALSE TRUE FALSE FALSE ...
 $ RT               : int  1517 1920 2346 1773 2556 2043 2384 3078 1760 2218 ...
```

2 Plots

2.1 Discriminability

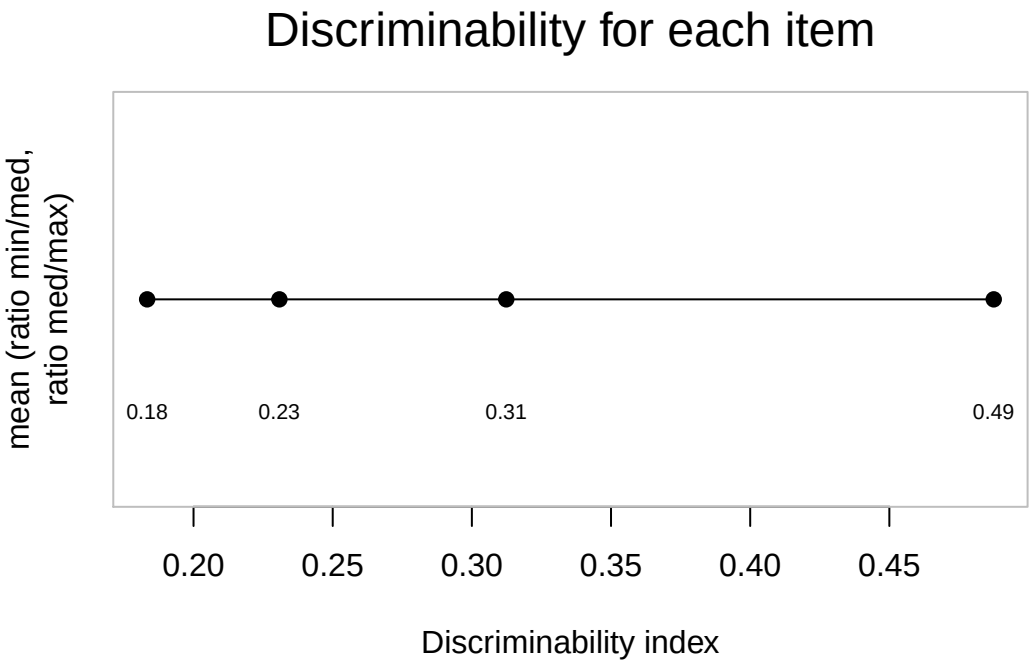


Figure 1: Ratios for different numbers of dots in the arrays: smaller values are more discriminable. Blue is for the ratio between the smallest number in the array and the largest number in an array. Red is for the mean of two ratios, one for the smallest number to the middle number, the other for the middle number to the largest number in the array

2.2 Consider using log RT

```
Error in `*tmp*`[[j]]:  subscript out of bounds
Warning in mean.default(dat_transforms[dat_transforms$dfSubset == k & dat_transforms$RTtype == :  argument is not numeric
or logical:  returning NA
Error in `[<-.data.frame`(`*tmp*`, dat_transforms$dfSubset == k & dat_transforms$RTtype == :  replacement has length
zero
```

```
Error:  measure variables not found in data:  RT_log, RT_raw
Error in ggplot(temp, aes(time, colour = RTtype)):  object 'temp' not found
```

2.3 How logging RT affects the distribution

```
Warning in readChar(con, 5L, useBytes = TRUE): cannot open compressed file 'data_processed.Rda', probable reason 'No
such file or directory'
Error in readChar(con, 5L, useBytes = TRUE): cannot open the connection
Error:  measure variables not found in data:  RT_log, RT_raw
Error in ggplot(subdata):  object 'subdata' not found
```

2.4 Identify fast and slow subjects and items

```
Warning in mean.default(dd$RT_log):  argument is not numeric or logical:  returning NA
Error in mean(RT_log):  object 'RT_log' not found
Error in subs$level = 1:30:  object 'subs' not found
Error in factor(subs$effect, levels = c("subject", "discriminability")):  object 'subs' not found
Warning in mean.default(dd$RT_log):  argument is not numeric or logical:  returning NA
Error in mean(RT_log):  object 'RT_log' not found
Error in factor(itms$effect, levels = c("subject", "discriminability")):  object 'itms' not found
Error in rbind(subs, itms):  object 'subs' not found
Error in factor(si$effect, levels = c("subject", "discriminability")):  object 'si' not found
Error in unique(si$emean):  object 'si' not found
Error in eval(substitute(groups), data, environment(x)):  object 'si' not found
Error in inherits(obj1, "trellis"):  object 'my1' not found
```

2.5 Plot main effects in both transformations

```
Error:  measure variables not found in data:  RT_raw
Error in reshape2::melt(tempraw, id.vars = c("transformation", "score"), :  object 'tempraw' not found
Error:  measure variables not found in data:  RT_log
Error in reshape2::melt(templog, id.vars = c("transformation", "score"), :  object 'templog' not found
```

```
Error in ggplot(tempraw2, aes(y = score, x = level, group = 1, col = effect)):  object 'tempraw2' not found
```

```
Error in ggplot(templog2, aes(y = score, x = level, group = 1, col = effect)):  object 'templog2' not found
```

2.6 Main effects in log RT over discriminability

```
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in names(nrts)[5] <- "Levels":  object 'nrts' not found
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in names(orts)[5] <- "Levels":  object 'orts' not found
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in names(qrts)[5] <- "Levels":  object 'qrts' not found
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in names(vrts)[5] <- "Levels":  object 'vrts' not found
Error in rbind(nrts, orts, qrts, vrts):  object 'nrts' not found
Error in eval(expr, envir, enclos):  object 'rts' not found
Error in eval(expr, envir, enclos):  object 'rts' not found
Error in eval(expr, envir, enclos):  object 'rts' not found
Error in ggplot(data = rts, aes(x = discriminability, y = RT_log, group = Levels)):  object 'rts' not found
Error in eval(expr, envir, enclos):  object 'p1' not found
```

2.7 2-Way interactions over discriminability

```
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in names(rts1)[2] <- "F1":  object 'rts1' not found
Error in names(rts1)[3] <- "F2":  object 'rts1' not found
Error in rts1$E1 <- "Vagueness":  object 'rts1' not found
Error in rts1$E2 <- "Number":  object 'rts1' not found
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in names(rts2)[2] <- "F1":  object 'rts2' not found
Error in names(rts2)[3] <- "F2":  object 'rts2' not found
Error in rts2$E1 <- "Vagueness":  object 'rts2' not found
Error in rts2$E2 <- "Quantity":  object 'rts2' not found
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in names(rts3)[2] <- "F1":  object 'rts3' not found
Error in names(rts3)[3] <- "F2":  object 'rts3' not found
Error in rts3$E1 <- "Vagueness":  object 'rts3' not found
Error in rts3$E2 <- "Order":  object 'rts3' not found
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in names(rts4)[2] <- "F1":  object 'rts4' not found
Error in names(rts4)[3] <- "F2":  object 'rts4' not found
Error in rts4$E1 <- "Quantity":  object 'rts4' not found
Error in rts4$E2 <- "Number":  object 'rts4' not found
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in names(rts5)[2] <- "F1":  object 'rts5' not found
Error in names(rts5)[3] <- "F2":  object 'rts5' not found
Error in rts5$E1 <- "Order":  object 'rts5' not found
Error in rts5$E2 <- "Number":  object 'rts5' not found
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in names(rts6)[2] <- "F1":  object 'rts6' not found
Error in names(rts6)[3] <- "F2":  object 'rts6' not found
Error in rts6$E1 <- "Quantity":  object 'rts6' not found
Error in rts6$E2 <- "Order":  object 'rts6' not found
Error in rbind(rts1, rts2, rts3, rts4, rts5, rts6):  object 'rts1' not found
Error in eval(expr, envir, enclos):  object 'rts' not found
Error in eval(expr, envir, enclos):  object 'rts' not found
Error in eval(expr, envir, enclos):  object 'rts' not found
Error in paste(rts$F1, rts$F2):  object 'rts' not found
Error in factor(rts$E1, levels = c("Number", "Order", "Quantity", "Vagueness")):  object 'rts' not found
Error in factor(rts$E2, levels = c("Number", "Order", "Quantity", "Vagueness")):  object 'rts' not found
Error in ggplot(rts, aes(y = RT_log, x = discriminability, group = F3, :  object 'rts' not found
```

2.8 Vagueness by number interaction over items

```
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in paste(rts$Number, rts$Vagueness, sep = " "):  object 'rts' not found
Error in ggplot(rts, aes(y = RT_log, x = Item, ymin = RT_log - ci, ymax = RT_log + :  object 'rts' not found
```

2.9 Vagueness by number interaction over discriminability

```
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in eval(expr, envir, enclos):  object 'rts' not found
Error in paste(rts$Number, rts$Vagueness, sep = " "):  object 'rts' not found
Error in ggplot(rts, aes(y = RT_log, x = discriminability, ymin = RT_log - :  object 'rts' not found
```

2.10 3-Way interactions

```
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in eval(expr, envir, enclos):  object 'rts' not found
Error in eval(expr, envir, enclos):  object 'rts' not found
Error in ggplot(rts, aes(y = RT_log, x = Number, group = Vagueness, ymin = mins, :  object 'rts' not found
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in eval(expr, envir, enclos):  object 'rts' not found
Error in eval(expr, envir, enclos):  object 'rts' not found
Error in ggplot(rts, aes(y = RT_log, x = Number, group = Vagueness, ymin = mins, :  object 'rts' not found
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in eval(expr, envir, enclos):  object 'rts' not found
Error in eval(expr, envir, enclos):  object 'rts' not found
Error in ggplot(rts, aes(y = RT_log, x = Number, group = Quantity, ymin = mins, :  object 'rts' not found
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in eval(expr, envir, enclos):  object 'rts' not found
Error in eval(expr, envir, enclos):  object 'rts' not found
Error in ggplot(rts, aes(y = RT_log, x = Vagueness, group = Quantity, :  object 'rts' not found
Error in arrangeGrob(...):  object 'p1' not found
```

2.11 Vagueness by number by quantity over discriminability

```
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in paste(rts$Number, rts$Vagueness, sep = " "):  object 'rts' not found
Error in eval(expr, envir, enclos):  object 'rts' not found
Error in ggplot(rts, aes(y = RT_log, x = discriminability, ymin = RT_log - :  object 'rts' not found
```

2.12 4-Way interaction

```
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in paste(rts$Number, rts$Vagueness, sep = " "):  object 'rts' not found
Error in ggplot(rts, aes(y = RT_log, x = Vagueness, ymin = RT_log - ci, :  object 'rts' not found
```

2.13 4-Way interaction split over discriminability

```
Error in `[.data.frame`(xx, , col):  undefined columns selected
Error in paste(rts$Number, rts$Vagueness, sep = " "):  object 'rts' not found
Error in eval(expr, envir, enclos):  object 'rts' not found
Error in ggplot(rts, aes(y = RT_log, x = discriminability, ymin = RT_log - :  object 'rts' not found
```

3 Lmer model: before outlier removal

```
load("data_processed.Rda")
```

```
Warning in readChar(con, 5L, useBytes = TRUE): cannot open compressed file 'data_processed.Rda', probable reason 'No
such file or directory'
Error in readChar(con, 5L, useBytes = TRUE): cannot open the connection
```

```
v5 <- lme4::lmer(data=dd,
                 RT_log ~
                   c_Vag + c_Num + c_Qty + c_Ord +
                   c_Num:c_Vag:c_Qty +
                   discriminability +
                   s_Trl +
                   RTprev_log +
                   nchar_instr +
                   (1+c_Vag + c_Num + c_Qty + c_Ord|Subject))
```

```
Linear mixed model fit by REML ['lmerMod']
Formula: RT_log ~ c_Vag + c_Num + c_Qty + c_Ord + c_Num:c_Vag:c_Qty +
    discriminability + s_Trl + RTprev_log + nchar_instr + (1 +
    c_Vag + c_Num + c_Qty + c_Ord | Subject)
   Data: dd

REML criterion at convergence: 11474.8

Scaled residuals:
    Min      1Q  Median      3Q     Max
-4.5470 -0.6351 -0.0955  0.5372  5.0914

Random effects:
 Groups   Name        Variance Std.Dev. Corr
 Subject  (Intercept) 0.153949 0.39236
          c_Vag       0.001546 0.03932   0.69
          c_Num       0.165314 0.40659  -0.67 -0.64
          c_Qty       0.008148 0.09027   0.16  0.26 -0.34
          c_Ord       0.001559 0.03949  -0.13  0.02 -0.39 -0.52
 Residual             0.249734 0.49973
Number of obs: 7677, groups:  Subject, 30

Fixed effects:
                  Estimate Std. Error t value
(Intercept)       7.171685   0.122236   58.67
c_Vag             0.060938   0.013873    4.39
c_Num            -0.433614   0.075148   -5.77
c_Qty            -0.069067   0.020047   -3.45
c_Ord             0.017959   0.013497    1.33
discriminability -0.771402   0.049267  -15.66
s_Trl            -0.106972   0.005807  -18.42
RTprev_log        0.060469   0.009692    6.24
nchar_instr       0.006086   0.001944    3.13
c_Vag:c_Num:c_Qty 0.104949   0.046066    2.28

Correlation of Fixed Effects:
            (Intr) c_Vag  c_Num  c_Qty  c_Ord  dscrmn s_Trl  RTprv_ nchr_n
c_Vag        0.083
c_Num       -0.369 -0.337
c_Qty        0.069  0.117 -0.278
c_Ord       -0.052  0.007 -0.206 -0.228
discrmnblty -0.140  0.004 -0.001  0.000  0.001
s_Trl       -0.114  0.003 -0.001 -0.002  0.006  0.017
RTprev_log  -0.607  0.006 -0.004 -0.003  0.019  0.015  0.185
nchar_instr -0.524  0.237 -0.034  0.018  0.000  0.017  0.000  0.006
c_Vg:c_N:_Q  0.073 -0.033  0.005 -0.003  0.000 -0.002 -0.001 -0.002 -0.138
```

	Estimate	Std. Error	t value
(Intercept)	7.17	0.12	58.67
c_Vag	0.06	0.01	4.39
c_Num	-0.43	0.08	-5.77
c_Qty	-0.07	0.02	-3.45
c_Ord	0.02	0.01	1.33
discriminability	-0.77	0.05	-15.66
s_Trl	-0.11	0.01	-18.42
RTprev_log	0.06	0.01	6.24
nchar_instr	0.01	0.00	3.13
c_Vag:c_Num:c_Qty	0.10	0.05	2.28

Table 1: xtable v5

```
R^2
```

```
Error in cor(fitted(v5), dd$RT_log):  supply both 'x' and 'y' or a matrix-like 'x'
```

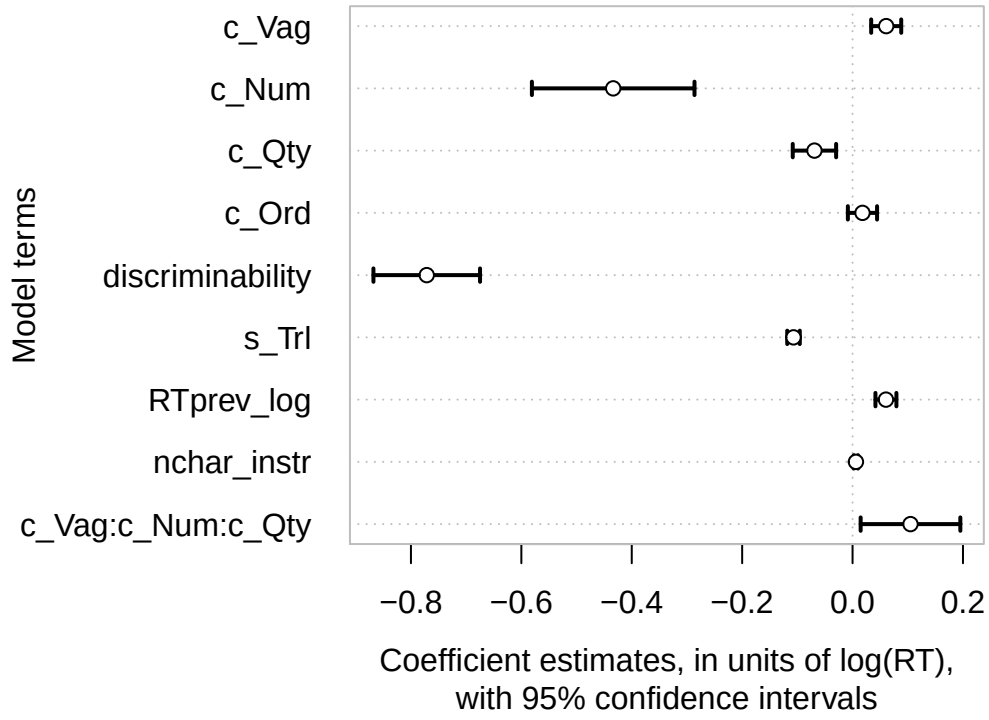


Figure 2: Coefficient estimates and their (Wald) 95 per cent confidence intervals

```
par(mfrow = c(2, 4))
plotLMER.fnc(v5)

effect size (range) for  c_Vag is  0.03470056
effect size (range) for  c_Num is  0.4073765
effect size (range) for  c_Qty is  0.09530422
effect size (range) for  c_Ord is  0.0179595
effect size (range) for  discriminability is  0.2346348
effect size (range) for  s_Trl is  0.369093
effect size (range) for  RTprev_log is  0.2759499
effect size (range) for  nchar_instr is  0.05477539
```

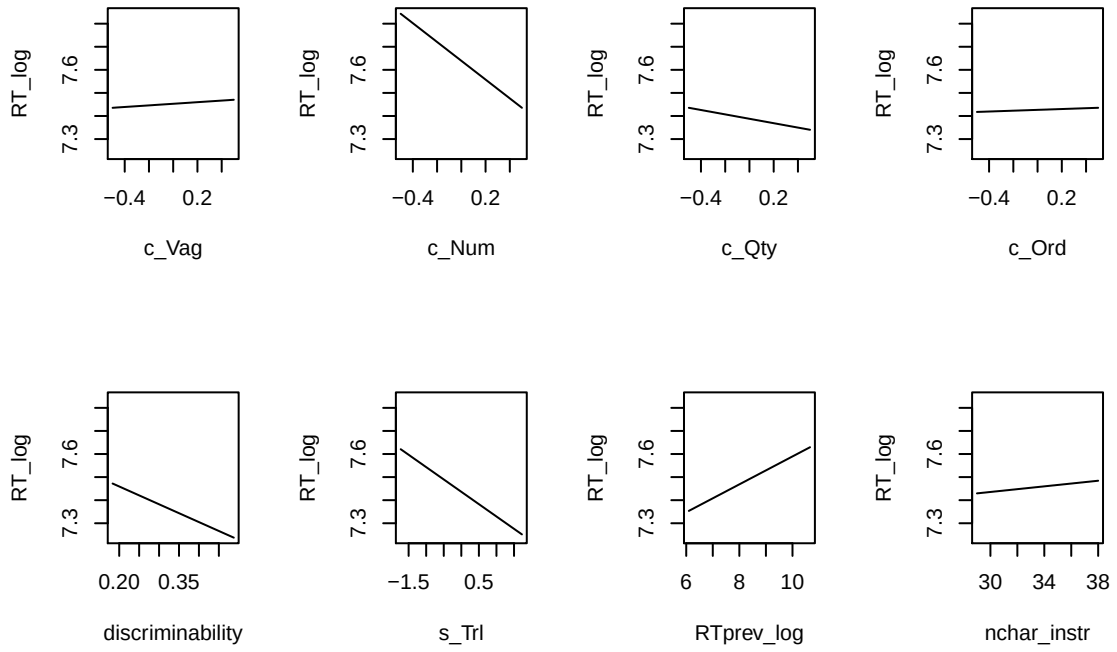


Figure 3: plotMLERfnc

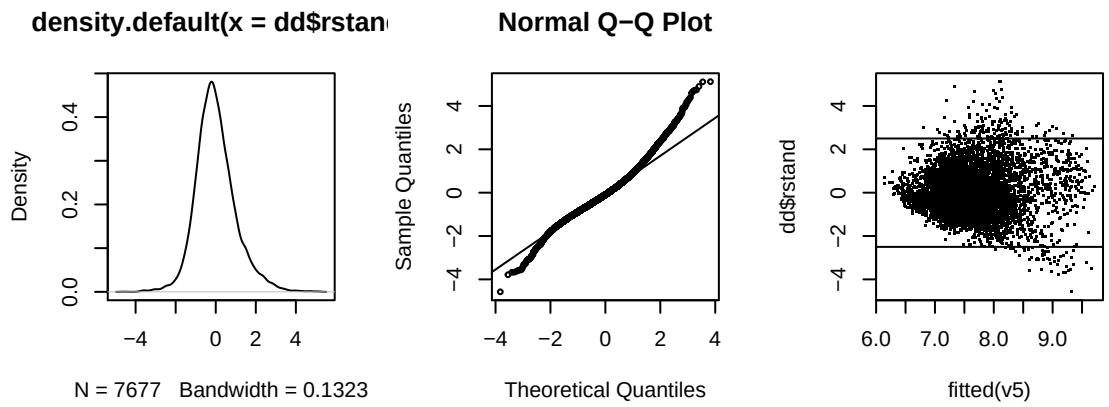


Figure 4: Baayen Model Criticism Plots

4 lmerTest Version

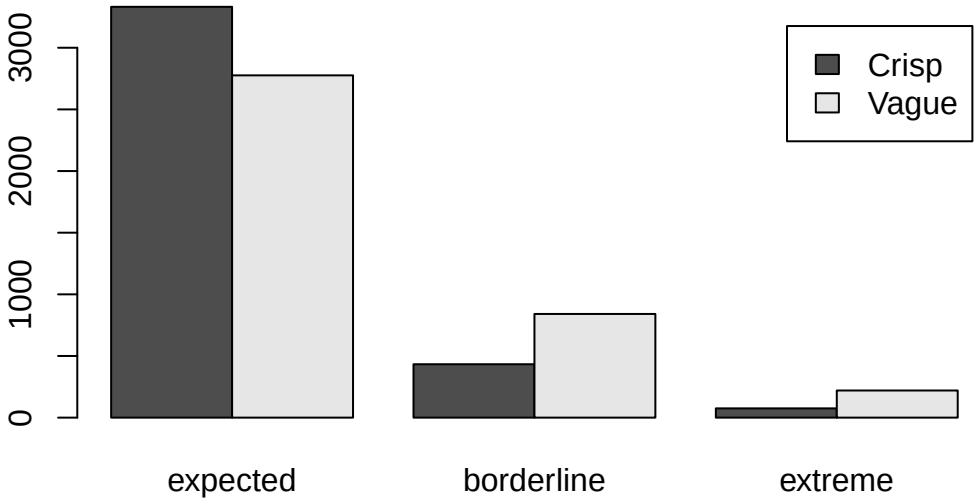
```
v6 <- lmerTest::lmer(data=dd,
                     RT_log ~
                       c_Vag + c_Num + c_Qty + c_Ord +
                       c_Num:c_Vag:c_Qty +
                       discriminability +
                       s_Trl +
                       RTprev_log +
                       nchar_instr +
                       (1+c_Vag + c_Num + c_Qty + c_Ord|Subject))
```

```
summary(v6)

Linear mixed model fit by REML t-tests use Satterthwaite approximations to degrees of freedom [
lmerMod]
Formula: RT_log ~ c_Vag + c_Num + c_Qty + c_Ord + c_Num:c_Vag:c_Qty +
    discriminability + s_Trl + RTprev_log + nchar_instr + (1 +
    c_Vag + c_Num + c_Qty + c_Ord | Subject)
   Data: dd

REML criterion at convergence: 11474.8

Scaled residuals:
    Min      1Q  Median      3Q     Max
-4.5470 -0.6351 -0.0955  0.5372  5.0914

Random effects:
 Groups   Name        Variance Std.Dev. Corr
 Subject  (Intercept) 0.153949 0.39236
          c_Vag       0.001546 0.03932   0.69
          c_Num       0.165314 0.40659  -0.67 -0.64
          c_Qty       0.008148 0.09027   0.16  0.26 -0.34
          c_Ord       0.001559 0.03949  -0.13  0.02 -0.39 -0.52
 Residual             0.249734 0.49973
Number of obs: 7677, groups:  Subject, 30

Fixed effects:
                    Estimate Std. Error         df t value Pr(>|t|)
(Intercept)        7.172e+00  1.222e-01  2.370e+02  58.671  < 2e-16 ***
c_Vag              6.094e-02  1.387e-02  3.300e+01   4.393 0.000112 ***
c_Num             -4.336e-01  7.515e-02  2.900e+01  -5.770 2.97e-06 ***
c_Qty             -6.907e-02  2.005e-02  2.900e+01  -3.445 0.001743 **
c_Ord              1.796e-02  1.350e-02  5.100e+01   1.331 0.189164
discriminability  -7.714e-01  4.927e-02  7.551e+03 -15.658  < 2e-16 ***
s_Trl             -1.070e-01  5.807e-03  7.558e+03 -18.421  < 2e-16 ***
RTprev_log         6.047e-02  9.692e-03  7.594e+03   6.239 4.63e-10 ***
nchar_instr        6.086e-03  1.944e-03  7.551e+03   3.131 0.001749 **
c_Vag:c_Num:c_Qty  1.049e-01  4.607e-02  7.551e+03   2.278 0.022742 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
            (Intr) c_Vag  c_Num  c_Qty  c_Ord  dscrmn s_Trl  RTprv_ nchr_n
c_Vag        0.083
c_Num       -0.369 -0.337
c_Qty        0.069  0.117 -0.278
c_Ord       -0.052  0.007 -0.206 -0.228
discrmnblty -0.140  0.004 -0.001  0.000  0.001
s_Trl       -0.114  0.003 -0.001 -0.002  0.006  0.017
RTprev_log  -0.607  0.006 -0.004 -0.003  0.019  0.015  0.185
nchar_instr -0.524  0.237 -0.034  0.018  0.000  0.017  0.000  0.006
c_Vg:c_N:_Q  0.073 -0.033  0.005 -0.003  0.000 -0.002 -0.001 -0.002 -0.138
```

5 Lmer model: after outlier removal

not done yet.

6 Borderline responses



	Crisp	Vague
expected	3332	2776
borderline	433	841
extreme	75	220

Table 2: Borderline cases counts

A Functions listing

A.1 Gather Data

```
source("e2-preprocessing.R", echo = T)


> gatherData = function() {
+     number_of_valid_subjects = 30
+     number_of_trials_per_subject = 256
+     message("Starting to gather data")
+    .... [TRUNCATED]

> declareImpossibleRT = function(dat) {
+     message("Starting to declare impossible RTs")
+     dat$NaType = "valid_trial"
+     dat$NaType[dat$RT_o .... [TRUNCATED]

> removeImpossibleTrials = function(dat) {
+     message("Starting to remove impossible trials")
+     a = nrow(dat)
+     dat <- dat[complete.cases(d .... [TRUNCATED]
```