

# Analysis file accompanying Beck and Vasishth's article *Multiple Focus*, to appear in Journal of Semantics

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## 1 Preliminaries

Load data:

```
> e1datafiller <- read.table(file = "e1datafiller.txt")  
> colnames(e1datafiller) <- c("subject", "itemtype", "item", "rating",
```

```

+      "RT")
> e2datafiller <- read.table(file = "e2datafiller.txt")
> colnames(e2datafiller) <- c("subject", "itemtype", "item", "rating",
+      "RT")
> e1e2 <- read.table("targetcontrol.txt", header = FALSE)
> colnames(e1e2) <- c("Subject", "Expt", "item", "cond", "rating",
+      "RT", "binary")

```

The mean ratings for fillers for each session:

```

> (meanfillere1 <- with(e1datafiller, tapply(rating, IND = list(item),
+      mean)))

```

	1	2	3	4	5	6	7	8
3.933333	3.933333	3.800000	3.933333	3.866667	3.733333	3.933333	4.000000	
	9	10	11	12	13	14	15	16
4.000000	3.800000	3.933333	3.933333	3.933333	3.333333	3.733333	1.133333	
	17	18	19	20				
1.133333	2.866667	1.133333	1.200000					

```

> (meanfillere2 <- with(e2datafiller, tapply(rating, IND = list(item),
+      mean)))

```

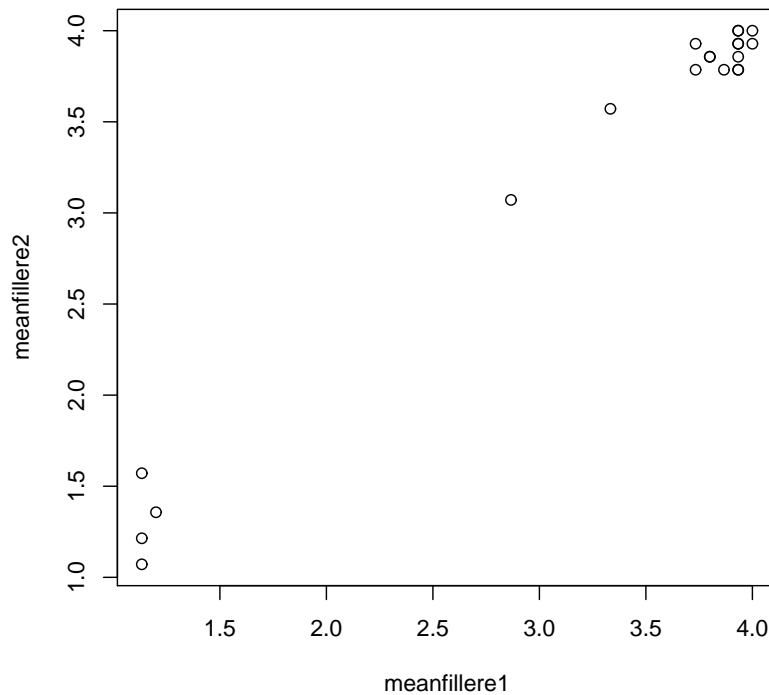
	1	2	3	4	5	6	7	8
4.000000	3.785714	3.857143	3.928571	3.785714	3.928571	4.000000	4.000000	
	9	10	11	12	13	14	15	16
3.928571	3.857143	3.785714	3.928571	3.857143	3.571429	3.785714	1.571429	
	17	18	19	20				
1.071429	3.071429	1.214286	1.357143					

The participants' responses to the fillers (in the two sessions) are, as expected, very steady:

```

> plot(meanfillere1, meanfillere2)

```



## 2 Data analysis

### 2.1 Targets versus controls (overall)

First, the mixed-effects model's results:

```
> summary(model.cont <- lmer(rating ~ Expt + (1 | Subject) + (1 |
+ item), e1e2))
```

Linear mixed model fit by REML

Formula: rating ~ Expt + (1 | Subject) + (1 | item)

Data: e1e2

	AIC	BIC	logLik	deviance	REMLdev
	690.7	708.5	-340.3	676.2	680.7

Random effects:

Groups	Name	Variance	Std.Dev.
Subject	(Intercept)	0.264243	0.51405
item	(Intercept)	0.064184	0.25334
Residual		0.668305	0.81750

Number of obs: 261, groups: Subject, 16; item, 9

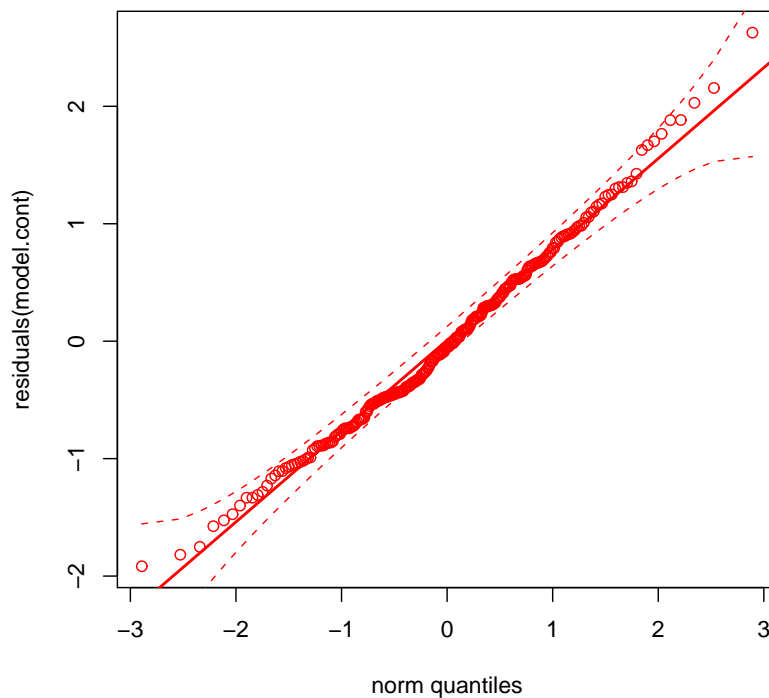
Fixed effects:

	Estimate	Std. Error	t value
(Intercept)	1.9450	0.1698	11.452
ExptE2	0.4183	0.1056	3.962

```
Correlation of Fixed Effects:
      (Intr)
ExptE2 -0.293
```

For each lme analysis we check whether the residuals are approximately normally distributed:

```
> qq.plot(residuals(model.cont))
```



Next, the ANOVA:

```
> e1e2.balanced <- subset(e1e2, (Subject != 109 & Subject != 108 &
+   Subject != 106))
> with(e1e2.balanced, tapply(rating, Expt, mean))
```

```
      E1      E2
1.931624 2.350427
```

```
> e1e2.balanced$Subject <- factor(e1e2.balanced$Subject)
> table(e1e2.balanced$Subject, e1e2.balanced$Expt)
```

```
      E1 E2
1      9  9
2      9  9
```

```

3    9    9
4    9    9
101  9    9
102  9    9
103  9    9
104  9    9
105  9    9
107  9    9
110  9    9
111  9    9
112  9    9

```

```
> summary(aov(rating ~ Expt + Error(Subject/Expt), e1e2.balanced))
```

```
Error: Subject
```

```
      Df Sum Sq Mean Sq F value Pr(>F)
Residuals 12 76.179    6.348
```

```
Error: Subject:Expt
```

```
      Df  Sum Sq Mean Sq F value  Pr(>F)
Expt    1 10.2607 10.2607  9.1467 0.01058 *
Residuals 12 13.4615   1.1218
```

```
---
```

```
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Error: Within
```

```
      Df  Sum Sq Mean Sq F value Pr(>F)
Residuals 208 144.444    0.694
```

```
> summary(aov(rating ~ Expt + Error(factor(item)/Expt), e1e2.balanced))
```

```
Error: factor(item)
```

```
      Df  Sum Sq Mean Sq F value Pr(>F)
Residuals  8 18.4615   2.3077
```

```
Error: factor(item):Expt
```

```
      Df  Sum Sq Mean Sq F value Pr(>F)
Expt    1 10.2607 10.2607  3.4522 0.1002
Residuals  8 23.7778   2.9722
```

```
Error: Within
```

```
      Df  Sum Sq Mean Sq F value Pr(>F)
Residuals 216 191.846    0.888
```

## 2.2 Also vs only

```
> summary(model.cont.1 <- lmer(rating ~ Expt + (1 | Subject), subset(e1e2,
+   item == 1)))
```

```
Linear mixed model fit by REML
```

```
Formula: rating ~ Expt + (1 | Subject)
```

```

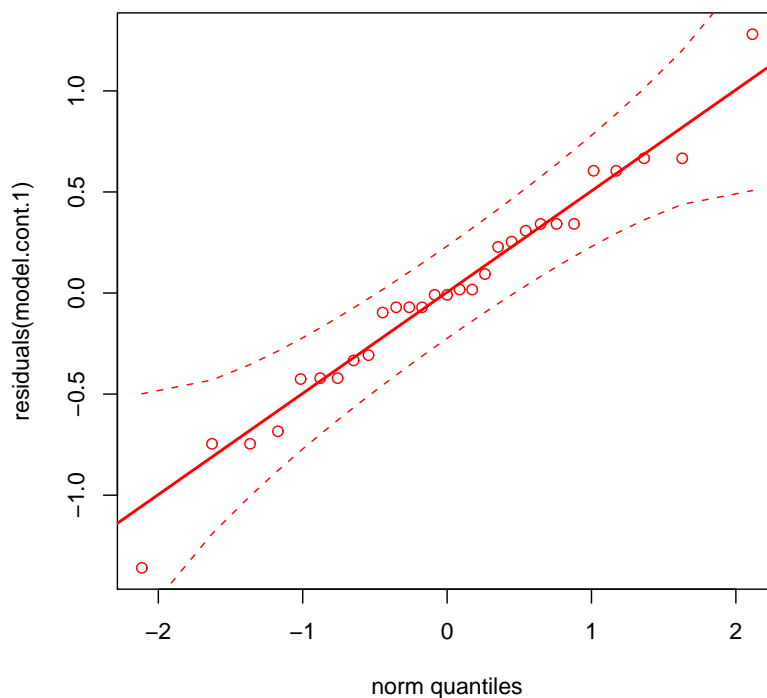
Data: subset(e1e2, item == 1)
   AIC   BIC logLik deviance REMLdev
83.05 88.52 -37.52   72.76   75.05
Random effects:
   Groups   Name      Variance Std.Dev.
Subject (Intercept) 0.41810  0.64661
Residual                0.45169  0.67208
Number of obs: 29, groups: Subject, 16

Fixed effects:
              Estimate Std. Error t value
(Intercept)   1.8190     0.2391   7.609
ExptE2         1.5877     0.2562   6.198

Correlation of Fixed Effects:
      (Intr)
ExptE2 -0.510

> qq.plot(residuals(model.cont.1))

```



```

> e1e2.balanced <- subset(e1e2, (item == 1 & Subject != 109 & Subject !=
+   108 & Subject != 106))
> e1e2.balanced$Subject <- factor(e1e2.balanced$Subject)
> table(e1e2.balanced$Subject, e1e2.balanced$Expt)

```

```

      E1 E2
1      1  1

```

```

2    1    1
3    1    1
4    1    1
101  1    1
102  1    1
103  1    1
104  1    1
105  1    1
107  1    1
110  1    1
111  1    1
112  1    1

```

```
> summary(aov(rating ~ Expt + Error(Subject/Expt), e1e2.balanced))
```

```
Error: Subject
```

```
      Df Sum Sq Mean Sq F value Pr(>F)
Residuals 12 17.1538  1.4295
```

```
Error: Subject:Expt
```

```
      Df Sum Sq Mean Sq F value Pr(>F)
Expt    1 15.3846 15.3846  32.877 9.4e-05 ***
Residuals 12  5.6154  0.4679
```

```
---
```

```
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

## 2.3 Also vs nobody

```
> summary(model.cont.4 <- lmer(rating ~ Expt + (1 | Subject), subset(e1e2,
+ item == 4)))
```

```
Linear mixed model fit by REML
```

```
Formula: rating ~ Expt + (1 | Subject)
```

```
Data: subset(e1e2, item == 4)
```

```
AIC   BIC logLik deviance REMLdev
```

```
83.39 88.86 -37.69    73.1    75.39
```

```
Random effects:
```

```
Groups   Name      Variance Std.Dev.
```

```
Subject (Intercept) 0.62837  0.7927
```

```
Residual              0.35892  0.5991
```

```
Number of obs: 29, groups: Subject, 16
```

```
Fixed effects:
```

```
      Estimate Std. Error t value
```

```
(Intercept)  2.2282    0.2533  8.796
```

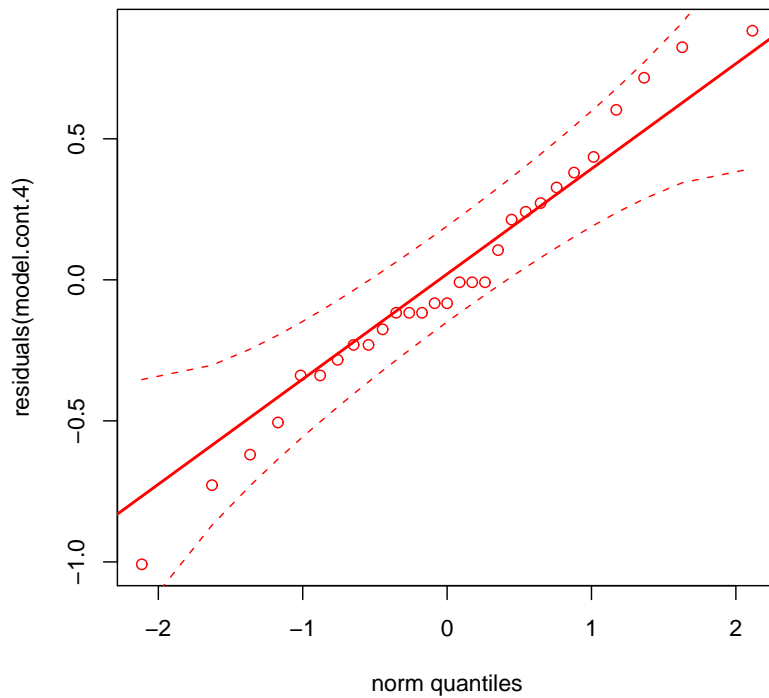
```
ExptE2       0.1082    0.2303  0.470
```

```
Correlation of Fixed Effects:
```

```
(Intr)
```

```
ExptE2 -0.431
```

```
> qq.plot(residuals(model.cont.4))
```



```
> e1e2.balanced <- subset(e1e2, (item == 4 & Subject != 109 & Subject !=
+ 108 & Subject != 106))
> e1e2.balanced$Subject <- factor(e1e2.balanced$Subject)
> table(e1e2.balanced$Subject, e1e2.balanced$Expt)
```

	E1	E2
1	1	1
2	1	1
3	1	1
4	1	1
101	1	1
102	1	1
103	1	1
104	1	1
105	1	1
107	1	1
110	1	1
111	1	1
112	1	1

```
> summary(aov(rating ~ Expt + Error(Subject/Expt), e1e2.balanced))
```

```
Error: Subject
      Df Sum Sq Mean Sq F value Pr(>F)
Residuals 12 22.6154  1.8846
```



```
Error: Subject:Expt
      Df Sum Sq Mean Sq F value Pr(>F)
Expt    1 0.0385  0.0385  0.1034 0.7533
Residuals 12 4.4615  0.3718
```

## 2.4 Also vs even

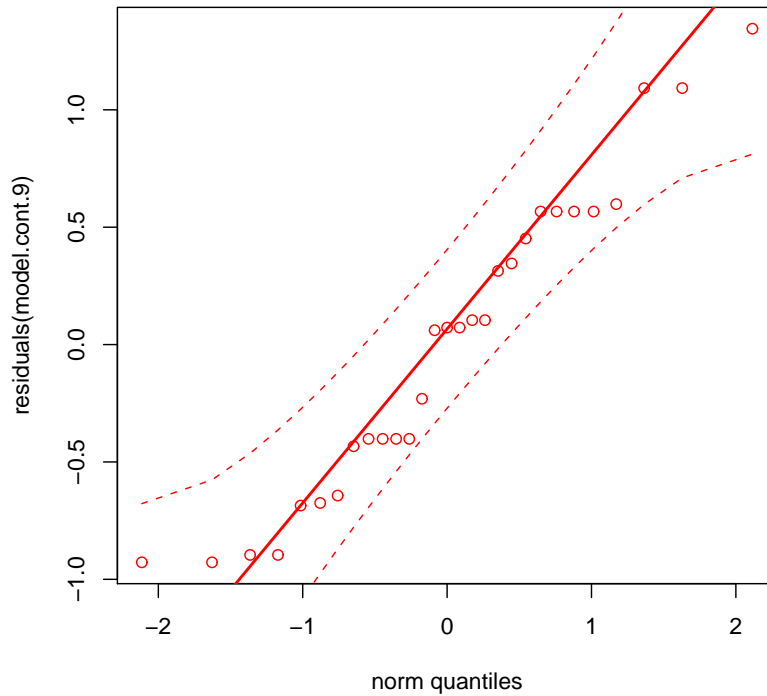
```
> summary(model.cont.9 <- lmer(rating ~ Expt + (1 | Subject), subset(e1e2,
+   item == 9)))
```

```
Linear mixed model fit by REML
Formula: rating ~ Expt + (1 | Subject)
Data: subset(e1e2, item == 9)
AIC   BIC logLik deviance REMLdev
85.64 91.11 -38.82   75.57   77.64
Random effects:
Groups   Name      Variance Std.Dev.
Subject (Intercept) 0.30426  0.55159
Residual              0.59500  0.77136
Number of obs: 29, groups: Subject, 16
```

```
Fixed effects:
              Estimate Std. Error t value
(Intercept)  2.34873    0.24398   9.627
ExptE2       -0.03154    0.29178  -0.108
```

```
Correlation of Fixed Effects:
      (Intr)
ExptE2 -0.571
```

```
> qq.plot(residuals(model.cont.9))
```



```
> e1e2.balanced <- subset(e1e2, (item == 9 & Subject != 109 & Subject !=
+ 108 & Subject != 106))
> e1e2.balanced$Subject <- factor(e1e2.balanced$Subject)
> table(e1e2.balanced$Subject, e1e2.balanced$Expt)
```

	E1	E2
1	1	1
2	1	1
3	1	1
4	1	1
101	1	1
102	1	1
103	1	1
104	1	1
105	1	1
107	1	1
110	1	1
111	1	1
112	1	1

```
> summary(aov(rating ~ Expt + Error(Subject/Expt), e1e2.balanced))
```

```
Error: Subject
      Df Sum Sq Mean Sq F value Pr(>F)
Residuals 12 13.6154  1.1346
```

```
Error: Subject:Expt
      Df    Sum Sq   Mean Sq    F value Pr(>F)
Expt    1 1.233e-30 1.233e-30 2.113e-30    1
Residuals 12    7.0000    0.5833
```

## 2.5 Only vs also

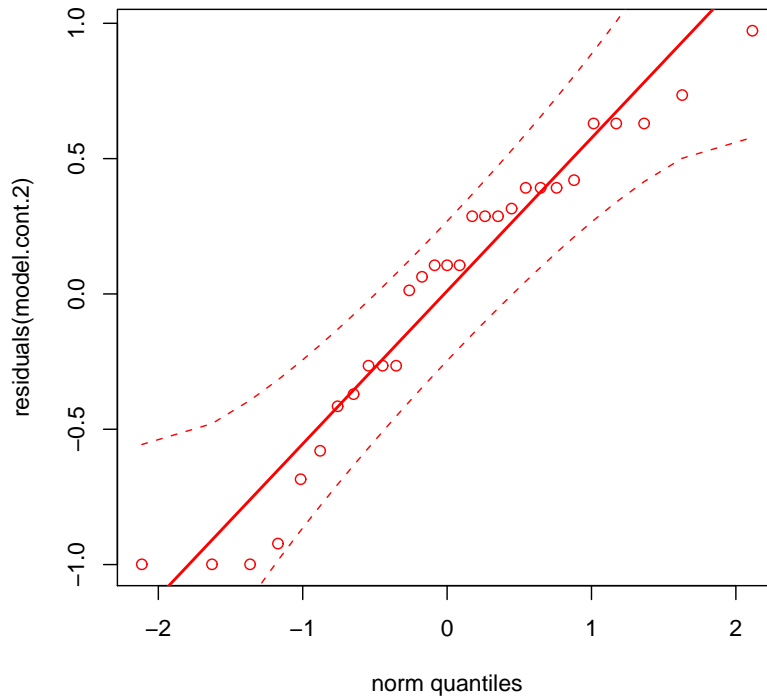
```
> summary(model.cont.2 <- lmer(rating ~ Expt + (1 | Subject), subset(e1e2,
+   item == 2)))
```

```
Linear mixed model fit by REML
Formula: rating ~ Expt + (1 | Subject)
Data: subset(e1e2, item == 2)
AIC   BIC logLik deviance REMLdev
88.16 93.63 -40.08    78.25    80.16
Random effects:
Groups   Name             Variance Std.Dev.
Subject (Intercept) 0.56170  0.74946
Residual                0.51528  0.71783
Number of obs: 29, groups: Subject, 16
```

```
Fixed effects:
              Estimate Std. Error t value
(Intercept)   1.8676     0.2657    7.03
ExptE2         1.1050     0.2742    4.03
```

```
Correlation of Fixed Effects:
      (Intr)
ExptE2 -0.490
```

```
> qq.plot(residuals(model.cont.2))
```



```
> e1e2.balanced <- subset(e1e2, (item == 2 & Subject != 109 & Subject !=
+ 108 & Subject != 106))
> e1e2.balanced$Subject <- factor(e1e2.balanced$Subject)
> table(e1e2.balanced$Subject, e1e2.balanced$Expt)
```

	E1	E2
1	1	1
2	1	1
3	1	1
4	1	1
101	1	1
102	1	1
103	1	1
104	1	1
105	1	1
107	1	1
110	1	1
111	1	1
112	1	1

```
> summary(aov(rating ~ Expt + Error(Subject/Expt), e1e2.balanced))
```

Error: Subject

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Residuals	12	22.4615	1.8718		

```
Error: Subject:Expt
      Df Sum Sq Mean Sq F value    Pr(>F)
Expt    1  7.5385   7.5385     14 0.002813 **
Residuals 12  6.4615   0.5385
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

## 2.6 Only vs nobody

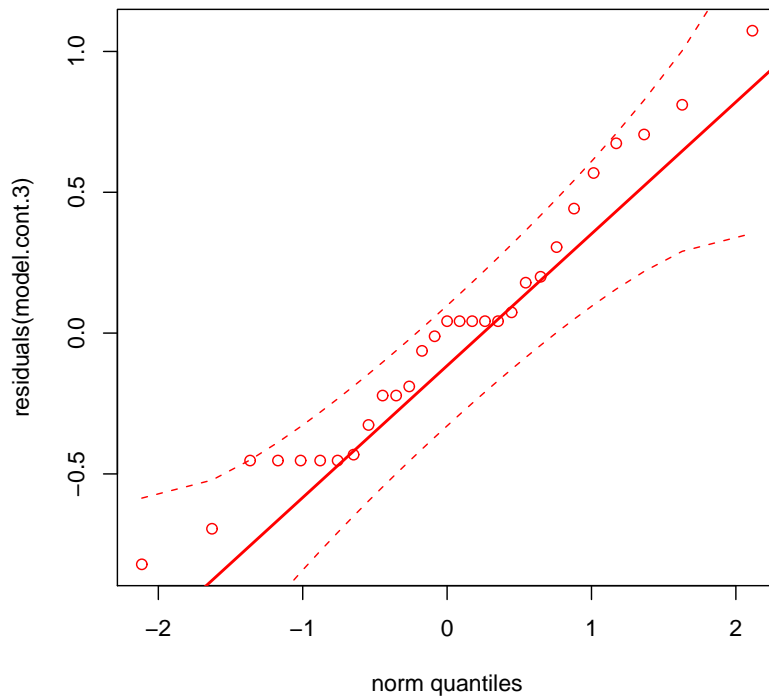
```
> summary(model.cont.3 <- lmer(rating ~ Expt + (1 | Subject), subset(e1e2,
+   item == 3)))
```

```
Linear mixed model fit by REML
Formula: rating ~ Expt + (1 | Subject)
Data: subset(e1e2, item == 3)
AIC      BIC logLik deviance REMLdev
81.77 87.24 -36.88    71.38    73.77
Random effects:
Groups   Name      Variance Std.Dev.
Subject (Intercept) 0.51817  0.71984
Residual              0.36995  0.60823
Number of obs: 29, groups: Subject, 16
```

```
Fixed effects:
              Estimate Std. Error t value
(Intercept)   1.5323      0.2407    6.365
ExptE2         0.4948      0.2331    2.122
```

```
Correlation of Fixed Effects:
      (Intr)
ExptE2 -0.459
```

```
> qq.plot(residuals(model.cont.3))
```



```
> e1e2.balanced <- subset(e1e2, (item == 3 & Subject != 109 & Subject !=
+ 108 & Subject != 106))
> e1e2.balanced$Subject <- factor(e1e2.balanced$Subject)
> table(e1e2.balanced$Subject, e1e2.balanced$Expt)
```

	E1	E2
1	1	1
2	1	1
3	1	1
4	1	1
101	1	1
102	1	1
103	1	1
104	1	1
105	1	1
107	1	1
110	1	1
111	1	1
112	1	1

```
> summary(aov(rating ~ Expt + Error(Subject/Expt), e1e2.balanced))
```

Error: Subject

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Residuals	12	19.3846	1.6154		

```
Error: Subject:Expt
      Df Sum Sq Mean Sq F value Pr(>F)
Expt    1  1.3846   1.3846    3.6 0.0821 .
Residuals 12  4.6154   0.3846
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

## 2.7 Only vs even

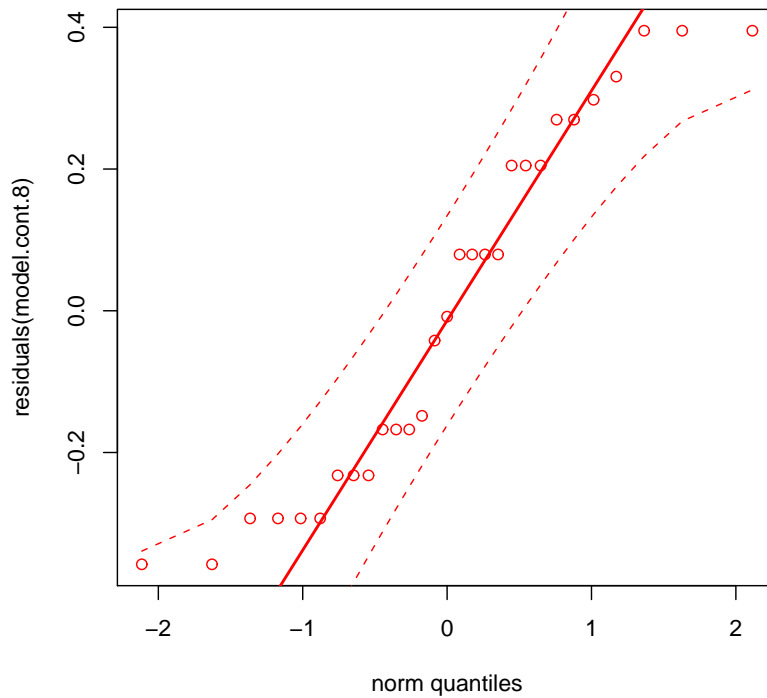
```
> summary(model.cont.8 <- lmer(rating ~ Expt + (1 | Subject), subset(e1e2,
+   item == 8)))
```

```
Linear mixed model fit by REML
Formula: rating ~ Expt + (1 | Subject)
Data: subset(e1e2, item == 8)
AIC   BIC logLik deviance REMLdev
64.13 69.6 -28.07   52.38   56.13
Random effects:
Groups   Name             Variance Std.Dev.
Subject (Intercept) 0.45034  0.67107
Residual                0.12927  0.35954
Number of obs: 29, groups: Subject, 16
```

```
Fixed effects:
              Estimate Std. Error t value
(Intercept)   1.6647     0.1928   8.633
ExptE2         0.3725     0.1393   2.674
```

```
Correlation of Fixed Effects:
      (Intr)
ExptE2 -0.341
```

```
> qq.plot(residuals(model.cont.8))
```



```
> e1e2.balanced <- subset(e1e2, (item == 8 & Subject != 109 & Subject !=
+ 108 & Subject != 106))
> e1e2.balanced$Subject <- factor(e1e2.balanced$Subject)
> table(e1e2.balanced$Subject, e1e2.balanced$Expt)
```

	E1	E2
1	1	1
2	1	1
3	1	1
4	1	1
101	1	1
102	1	1
103	1	1
104	1	1
105	1	1
107	1	1
110	1	1
111	1	1
112	1	1

```
> summary(aov(rating ~ Expt + Error(Subject/Expt), e1e2.balanced))
```

Error: Subject

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Residuals	12	11.5385	0.9615		



```
Error: Subject:Expt
      Df Sum Sq Mean Sq F value Pr(>F)
Expt    1 0.96154 0.96154    7.5 0.01798 *
Residuals 12 1.53846 0.12821
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

## 2.8 Even vs only

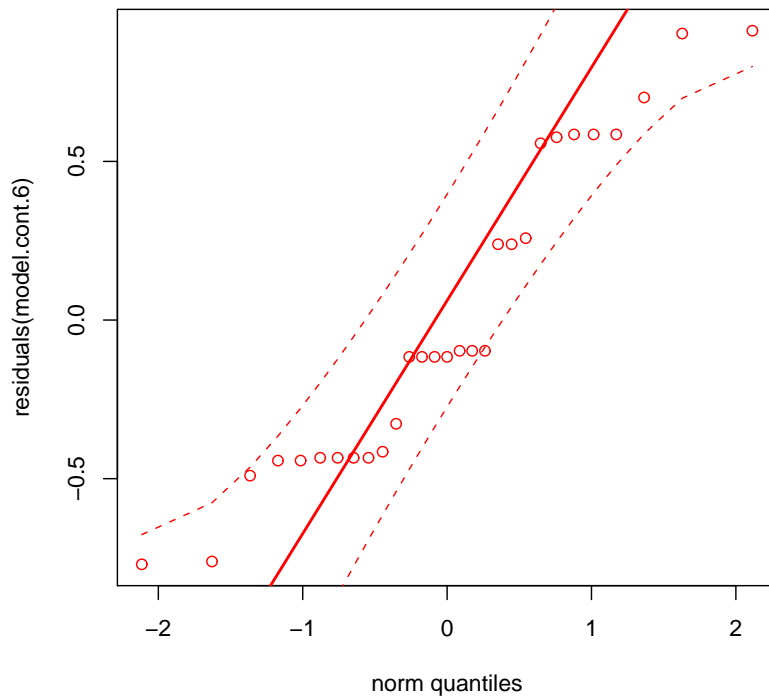
```
> summary(model.cont.6 <- lmer(rating ~ Expt + (1 | Subject), subset(e1e2,
+   item == 6)))
```

```
Linear mixed model fit by REML
Formula: rating ~ Expt + (1 | Subject)
Data: subset(e1e2, item == 6)
AIC   BIC logLik deviance REMLdev
79.3 84.77 -35.65   68.74   71.3
Random effects:
Groups   Name      Variance Std.Dev.
Subject (Intercept) 0.36885  0.60733
Residual              0.39039  0.62481
Number of obs: 29, groups: Subject, 16
```

```
Fixed effects:
              Estimate Std. Error t value
(Intercept)   1.6358     0.2233    7.325
ExptE2         0.3181     0.2382    1.335
```

```
Correlation of Fixed Effects:
      (Intr)
ExptE2 -0.507
```

```
> qq.plot(residuals(model.cont.6))
```



```
> e1e2.balanced <- subset(e1e2, (item == 6 & Subject != 109 & Subject !=
+ 108 & Subject != 106))
> e1e2.balanced$Subject <- factor(e1e2.balanced$Subject)
> table(e1e2.balanced$Subject, e1e2.balanced$Expt)
```

	E1	E2
1	1	1
2	1	1
3	1	1
4	1	1
101	1	1
102	1	1
103	1	1
104	1	1
105	1	1
107	1	1
110	1	1
111	1	1
112	1	1

```
> summary(aov(rating ~ Expt + Error(Subject/Expt), e1e2.balanced))
```

```
Error: Subject
      Df Sum Sq Mean Sq F value Pr(>F)
Residuals 12 12.5385  1.0449
```

```
Error: Subject:Expt
      Df Sum Sq Mean Sq F value Pr(>F)
Expt    1 0.9615  0.9615  2.5424 0.1368
Residuals 12 4.5385  0.3782
```

## 2.9 Even vs nobody

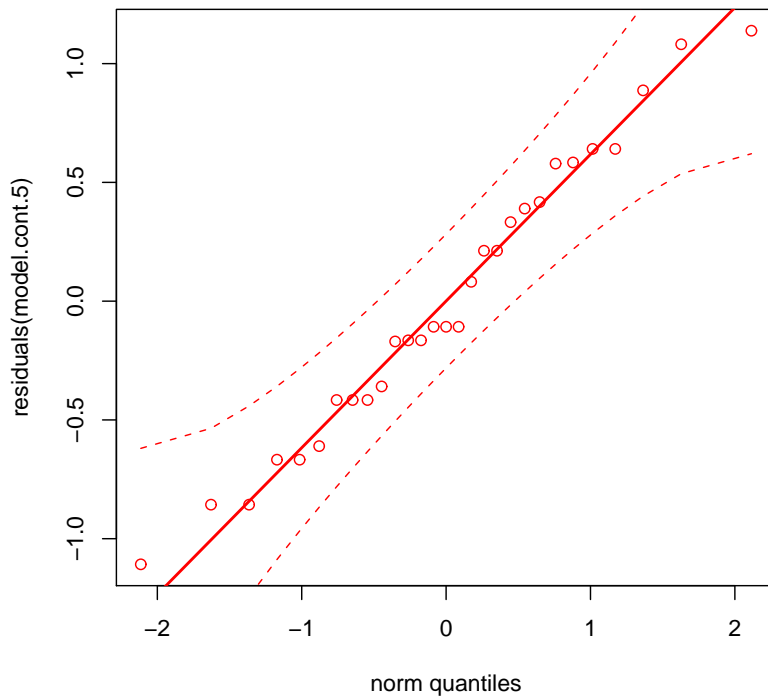
```
> summary(model.cont.5 <- lmer(rating ~ Expt + (1 | Subject), subset(e1e2,
+ item == 5)))
```

```
Linear mixed model fit by REML
Formula: rating ~ Expt + (1 | Subject)
Data: subset(e1e2, item == 5)
AIC BIC logLik deviance REMLdev
80.93 86.4 -36.46 70.5 72.93
Random effects:
Groups Name Variance Std.Dev.
Subject (Intercept) 0.25305 0.50304
Residual 0.50131 0.70803
Number of obs: 29, groups: Subject, 16
```

```
Fixed effects:
      Estimate Std. Error t value
(Intercept)  1.6807    0.2235  7.521
ExptE2       0.6917    0.2678  2.583
```

```
Correlation of Fixed Effects:
      (Intr)
ExptE2 -0.572
```

```
> qq.plot(residuals(model.cont.5))
```



```
> e1e2.balanced <- subset(e1e2, (item == 5 & Subject != 109 & Subject !=
+ 108 & Subject != 106))
> e1e2.balanced$Subject <- factor(e1e2.balanced$Subject)
> table(e1e2.balanced$Subject, e1e2.balanced$Expt)
```

	E1	E2
1	1	1
2	1	1
3	1	1
4	1	1
101	1	1
102	1	1
103	1	1
104	1	1
105	1	1
107	1	1
110	1	1
111	1	1
112	1	1

```
> summary(aov(rating ~ Expt + Error(Subject/Expt), e1e2.balanced))
```

```
Error: Subject
      Df Sum Sq Mean Sq F value Pr(>F)
Residuals 12 13.4615  1.1218
```

```
Error: Subject:Expt
      Df Sum Sq Mean Sq F value Pr(>F)
Expt    1 3.1154   3.1154   5.8554 0.03233 *
Residuals 12 6.3846   0.5321
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

## 2.10 Even vs also

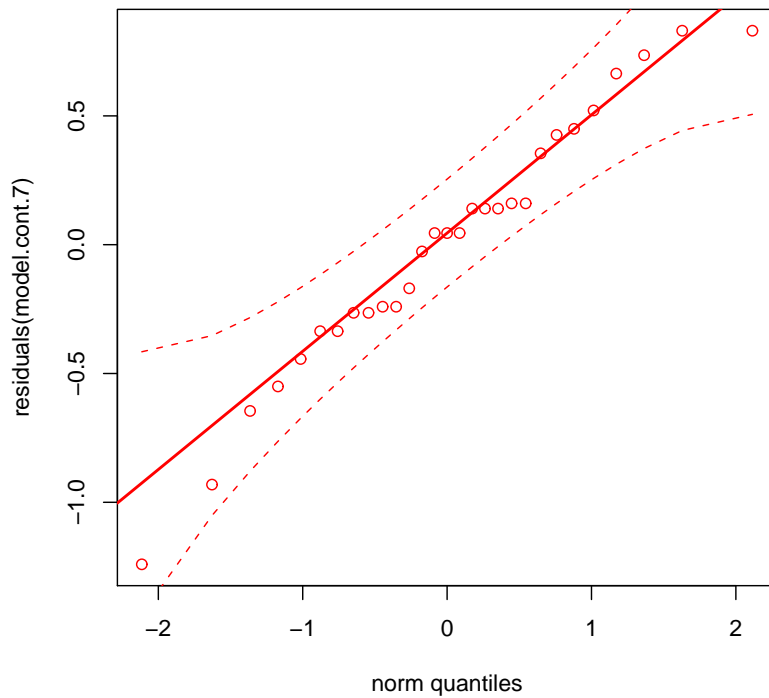
```
> summary(model.cont.7 <- lmer(rating ~ Expt + (1 | Subject), subset(e1e2,
+   item == 7)))
```

```
Linear mixed model fit by REML
Formula: rating ~ Expt + (1 | Subject)
Data: subset(e1e2, item == 7)
AIC      BIC logLik deviance REMLdev
77.85 83.32 -34.93    67.19    69.85
Random effects:
Groups   Name      Variance Std.Dev.
Subject (Intercept) 0.31622  0.56233
Residual              0.38914  0.62381
Number of obs: 29, groups: Subject, 16
```

```
Fixed effects:
              Estimate Std. Error t value
(Intercept)   2.7093     0.2155  12.573
ExptE2        -0.9050     0.2374  -3.813
```

```
Correlation of Fixed Effects:
      (Intr)
ExptE2 -0.524
```

```
> qq.plot(residuals(model.cont.7))
```



```
> e1e2.balanced <- subset(e1e2, (item == 7 & Subject != 109 & Subject !=
+ 108 & Subject != 106))
> e1e2.balanced$Subject <- factor(e1e2.balanced$Subject)
> table(e1e2.balanced$Subject, e1e2.balanced$Expt)
```

	E1	E2
1	1	1
2	1	1
3	1	1
4	1	1
101	1	1
102	1	1
103	1	1
104	1	1
105	1	1
107	1	1
110	1	1
111	1	1
112	1	1

```
> summary(aov(rating ~ Expt + Error(Subject/Expt), e1e2.balanced))
```

```
Error: Subject
      Df Sum Sq Mean Sq F value Pr(>F)
Residuals 12 13.6154  1.1346
```

Error: Subject:Expt

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Expt	1	4.6538	4.6538	11.524	0.005322 **
Residuals	12	4.8462	0.4038		

---

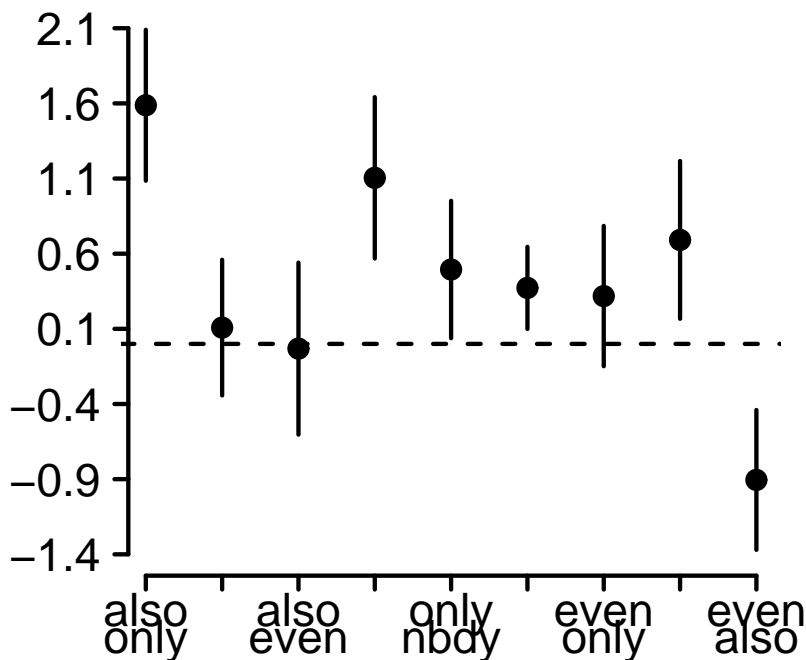
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

### 3 Graphical visualization of the results

First we load a file containing the fixed effects coefficients and standard errors corresponding to all the above analyses.

```
> fix <- read.table("fixef.txt")
> colnames(fix) <- c("item", "coef", "se")
> xlab2 <- c("also", "only", "also", "nbdy", "also", "even", "only",
+           "also", "only", "nbdy", "only", "even", "even", "only", "even",
+           "nbdy", "even", "also")

> y <- fix$coef
> lower <- y - qnorm(0.975) * fix$se
> upper <- y + qnorm(0.975) * fix$se
> min_y <- as.numeric(formatC(min(lower), digits = 2))
> max_y <- as.numeric(formatC(max(upper), digits = 2))
> p <- 9
> z <- c(0, 0, 0, 0, 0, 0, 0, 0, 0)
> plot(1:p, y, axes = F, xlab = "", ylab = "", pch = 19, cex = 2,
+      col = "black", ylim = c(min_y, max_y + 0.05), cex.main = 2)
> segments(c(1:p), lower, c(1:p), upper, lwd = 3, "black")
> axis(1, c(1:p), labels = rep("", 9), las = 1, lwd = 3)
> odd <- seq(1, 18, by = 2)
> axis(1, c(1:p), labels = xlab2[odd], tick = FALSE, las = 1, cex.axis = 2)
> even <- seq(2, 18, by = 2)
> axis(1, c(1:p), labels = xlab2[even], at = c(1:9), tick = FALSE,
+      las = 1, cex.axis = 2)
> axis(2, seq(min_y, max_y, by = 0.5), line = -0.25, las = 1, cex.axis = 2,
+      lwd = 3)
> abline(a = 0, b = 0, lty = 2, lwd = 3, col = gray(0))
```



```

> if (0) {
+   xlab1 <- c("also/only", "also/even", "only/nbdy", "even/only",
+             "even/also")
+   xlab2 <- c("also/nbdy", "only/also", "only/even", "even/nbdy")
+ }
> newitem <- ifelse(e1e2$item == 1, 1, ifelse(e1e2$item == 4, 2,
+   ifelse(e1e2$item == 9, 3, ifelse(e1e2$item == 2, 4, ifelse(e1e2$item ==
+   3, 5, ifelse(e1e2$item == 8, 6, ifelse(e1e2$item == 6,
+   7, ifelse(e1e2$item == 5, 8, ifelse(e1e2$item == 7, 9,
+   NA))))))))))
> e1e2$newitem <- newitem
> means <- with(e1e2, tapply(rating, IND = list(Expt, newitem),
+   mean))
> CI.E1 <- c()
> CI.E2 <- c()
> for (i in 1:9) {
+   cis <- ci(subset(e1e2, newitem == i & Expt == "E1")$rating)
+   CI.E1 <- rbind(CI.E1, cis)
+   cis <- ci(subset(e1e2, newitem == i & Expt == "E2")$rating)
+   CI.E2 <- rbind(CI.E2, cis)
+ }
> mygray <- gray(0.4)
> barplot(with(e1e2, tapply(rating, IND = list(Expt, newitem),
+   mean)), axes = F, axisnames = F, ylim = c(1, 4), col = c(mygray,
+   "white"), beside = TRUE, xpd = F, xlab = "", ylab = "", cex.lab = 2,
+   cex.main = 1.5)
> sequence <- seq(from = 1.5, to = 27, by = 3)
> arrows(sequence, CI.E1$lower, sequence, CI.E1$upper, angle = 90,

```



```

+     length = 0.05, code = 3, lwd = 2)
> sequence <- seq(from = 2.5, to = 29, by = 3)
> arrows(sequence, CI.E2$lower, sequence, CI.E2$upper, angle = 90,
+     length = 0.05, code = 3, lwd = 2)
> mtext("Ratings", side = 2, line = 2.7, cex = 1.8)
> sequence <- seq(from = 1.5, to = 27, by = 3) + 0.47
> odd <- seq(1, 18, by = 2)
> axis(1, sequence, labels = xlab2[odd], tick = FALSE, las = 1,
+     cex.axis = 2)
> even <- seq(2, 18, by = 2)
> axis(1, sequence, labels = xlab2[even], at = sequence, tick = FALSE,
+     las = 1, cex.axis = 2)
> if (0) {
+   axis(1, seq(2, 26, by = 6), labels = xlab1, line = -0.5,
+       tick = FALSE, las = 3, cex.axis = 1.1)
+   axis(1, seq(5, 26, by = 6), labels = xlab2, line = -0.5,
+       tick = FALSE, las = 3, cex.axis = 1.1)
+ }
> min_y <- min(e1e2$rating)
> max_y <- max(e1e2$rating)
> axis(2, seq(min_y, max_y, by = 1), line = 1, las = 1, cex.axis = 1.9)
> legend(15, 3.7, c("Target", "Control"), fill = c(mygray, "white"),
+     cex = 2.5)

```

