Exp 5 - Control-Response Analysis

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```
## Data: cc5Target
## Models:
## e5.ControlvTarget1: RespRate ~ Phase + ResponseType + (1 | ID)
## e5.ControlvTarget2: RespRate ~ Phase * ResponseType + (1 | ID)
##                     npar   AIC   BIC logLik deviance  Chisq Df Pr(>Chisq)
## e5.ControlvTarget1    6 93621 93663 -46804    93609
## e5.ControlvTarget2    8 92728 92785 -46356    92712 896.97  2  < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

## Linear mixed model fit by maximum likelihood  ['lmerMod']
## Formula: RespRate ~ Phase * ResponseType + (1 | ID)
##    Data: cc5Target
##
##      AIC       BIC   logLik deviance df.resid
##  92727.9   92784.5 -46356.0  92711.9     8704
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.9174 -0.6402  0.0205  0.3881  9.9561
##
## Random effects:
##  Groups   Name        Variance Std.Dev.
##  ID       (Intercept) 1051     32.41
##  Residual             2286     47.81
## Number of obs: 8712, groups:  ID, 198
##
## Fixed effects:
##                          Estimate Std. Error t value
## (Intercept)                17.618      2.465   7.147
## Phase2                      1.443      1.755   0.822
## Phase3                      2.332      2.558   0.912
## ResponseTypeTarget         76.431      1.241  61.602
## Phase2:ResponseTypeTarget -68.123      2.481 -27.453
## Phase3:ResponseTypeTarget -66.444      3.617 -18.368
##
## Correlation of Fixed Effects:
##             (Intr) Phase2 Phase3 RspnTT P2:RTT
## Phase2      -0.178
## Phase3      -0.122  0.171
## RspnsTypTrg -0.252  0.354  0.243
## Phs2:RspnTT  0.126 -0.707 -0.121 -0.500
## Phs3:RspnTT  0.086 -0.121 -0.707 -0.343  0.171
```

Fixed effects

```
## Registered S3 methods overwritten by 'car':
##   method                         from
##   influence.merMod               lme4
##   cooks.distance.influence.merMod lme4
##   dfbeta.influence.merMod        lme4
##   dfbetas.influence.merMod       lme4


## Analysis of Deviance Table (Type II Wald chisquare tests)
##
## Response: RespRate
##                   Chisq Df Pr(>Chisq)
## Phase            853.97  2  < 2.2e-16 ***
## ResponseType    2872.48  1  < 2.2e-16 ***
## Phase:ResponseType 945.92 2  < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```
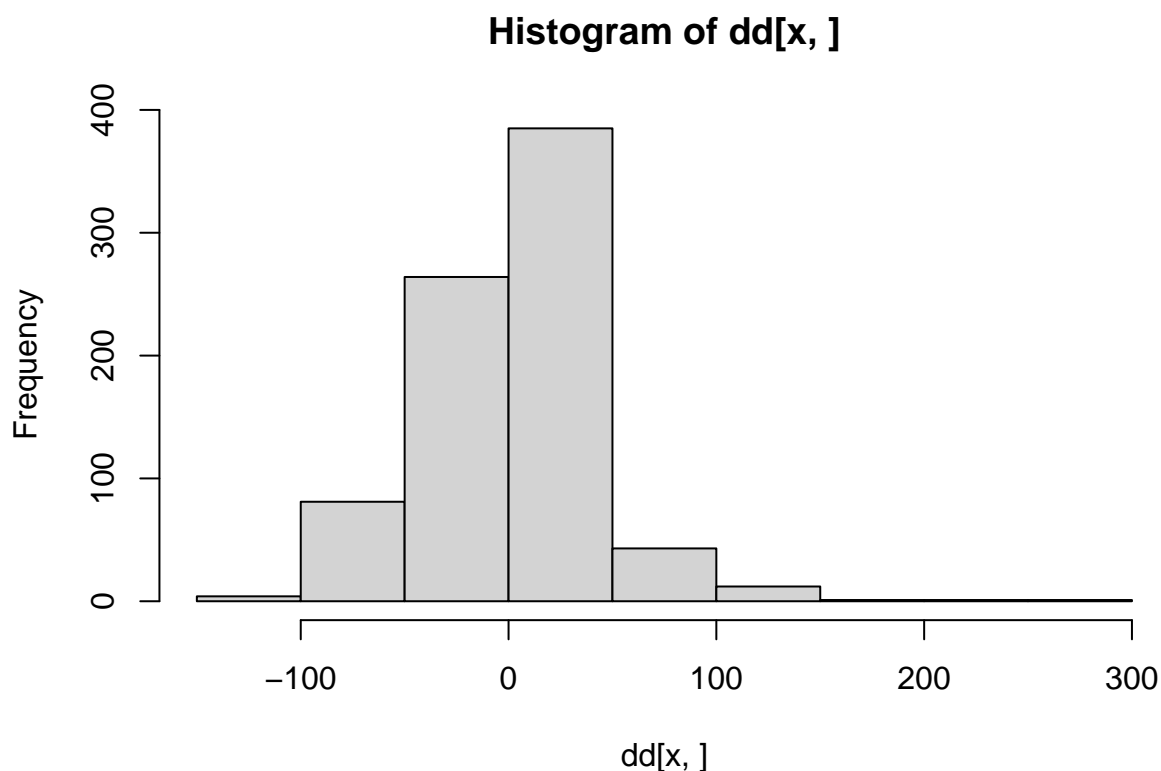
Histogram of dd[x,]

Checking residuals

Histogram of dd[x,]

Histogram of dd[x,]
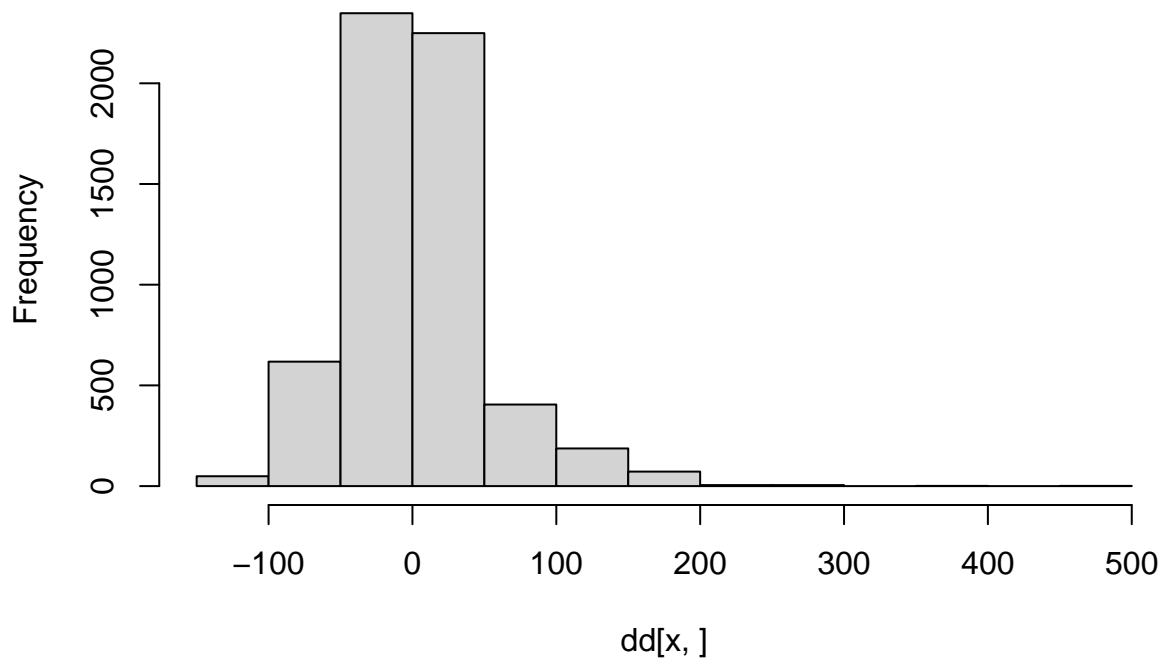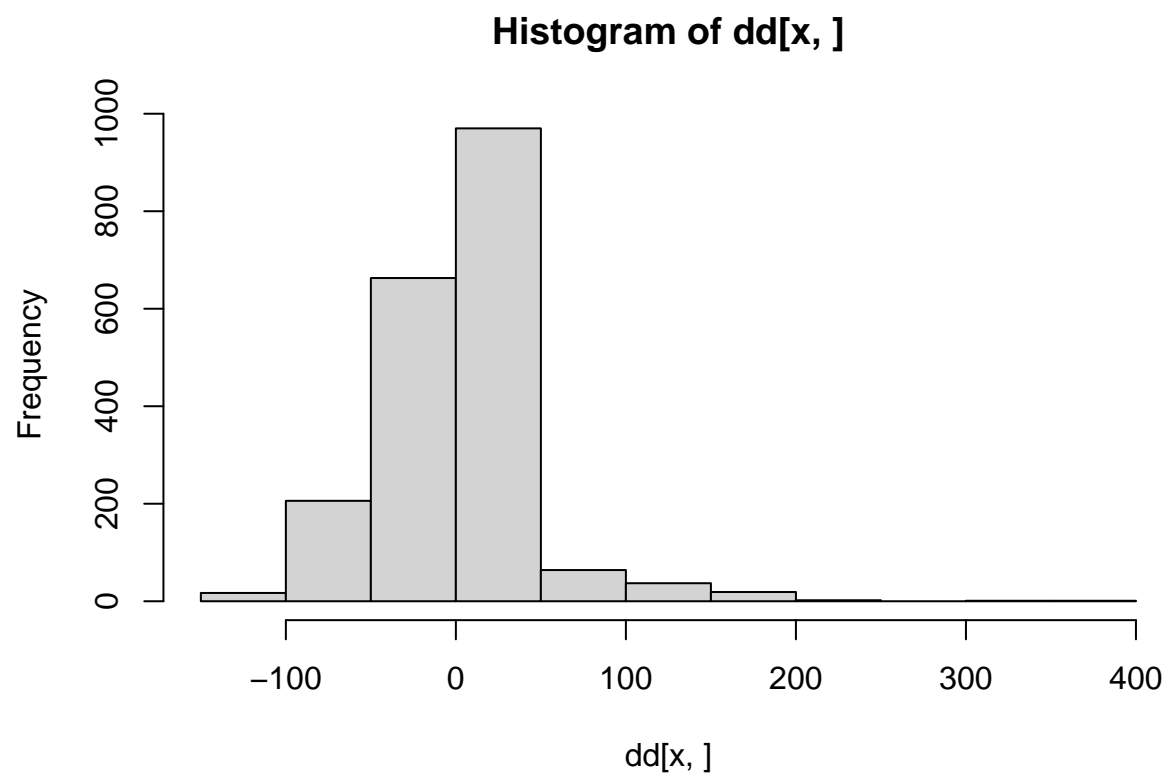


```
## cc5Target$Phase: 1
## $breaks
##  [1] -150 -100  -50    0   50  100  150  200  250  300  350  400  450  500
##
## $counts
##  [1]   49  618 2348 2249  405  187   72    5    5    0    1    0    1
##
## $density
##  [1] 1.649832e-04 2.080808e-03 7.905724e-03 7.572391e-03 1.363636e-03
##  [6] 6.296296e-04 2.424242e-04 1.683502e-05 1.683502e-05 0.000000e+00
## [11] 3.367003e-06 0.000000e+00 3.367003e-06
##
## $mids
##  [1] -125  -75  -25   25   75  125  175  225  275  325  375  425  475
##
## $xname
## [1] "dd[x, ]"
##
## $equidist
## [1] TRUE
##
## attr(,"class")
## [1] "histogram"
## -----------------------------------------------------------
## cc5Target$Phase: 2
## $breaks
```

```
##  [1] -150 -100  -50    0   50  100  150  200  250  300  350  400
##
## $counts
##  [1]  17 206 663 970  64  37  19   2   0   1   1
##
## $density
##  [1] 1.717172e-04 2.080808e-03 6.696970e-03 9.797980e-03 6.464646e-04
##  [6] 3.737374e-04 1.919192e-04 2.020202e-05 0.000000e+00 1.010101e-05
## [11] 1.010101e-05
##
## $mids
##  [1] -125  -75  -25   25   75  125  175  225  275  325  375
##
## $xname
## [1] "dd[x, ]"
##
## $equidist
## [1] TRUE
##
## attr(,"class")
## [1] "histogram"
## ------------------------------------------------------------
## cc5Target$Phase: 3
## $breaks
##  [1] -150 -100  -50    0   50  100  150  200  250  300
##
## $counts
## [1]   4  81 264 385  43  12   1   1   1
##
## $density
## [1] 1.010101e-04 2.045455e-03 6.666667e-03 9.722222e-03 1.085859e-03
## [6] 3.030303e-04 2.525253e-05 2.525253e-05 2.525253e-05
##
## $mids
## [1] -125  -75  -25   25   75  125  175  225  275
##
## $xname
## [1] "dd[x, ]"
##
## $equidist
## [1] TRUE
##
## attr(,"class")
## [1] "histogram"
```
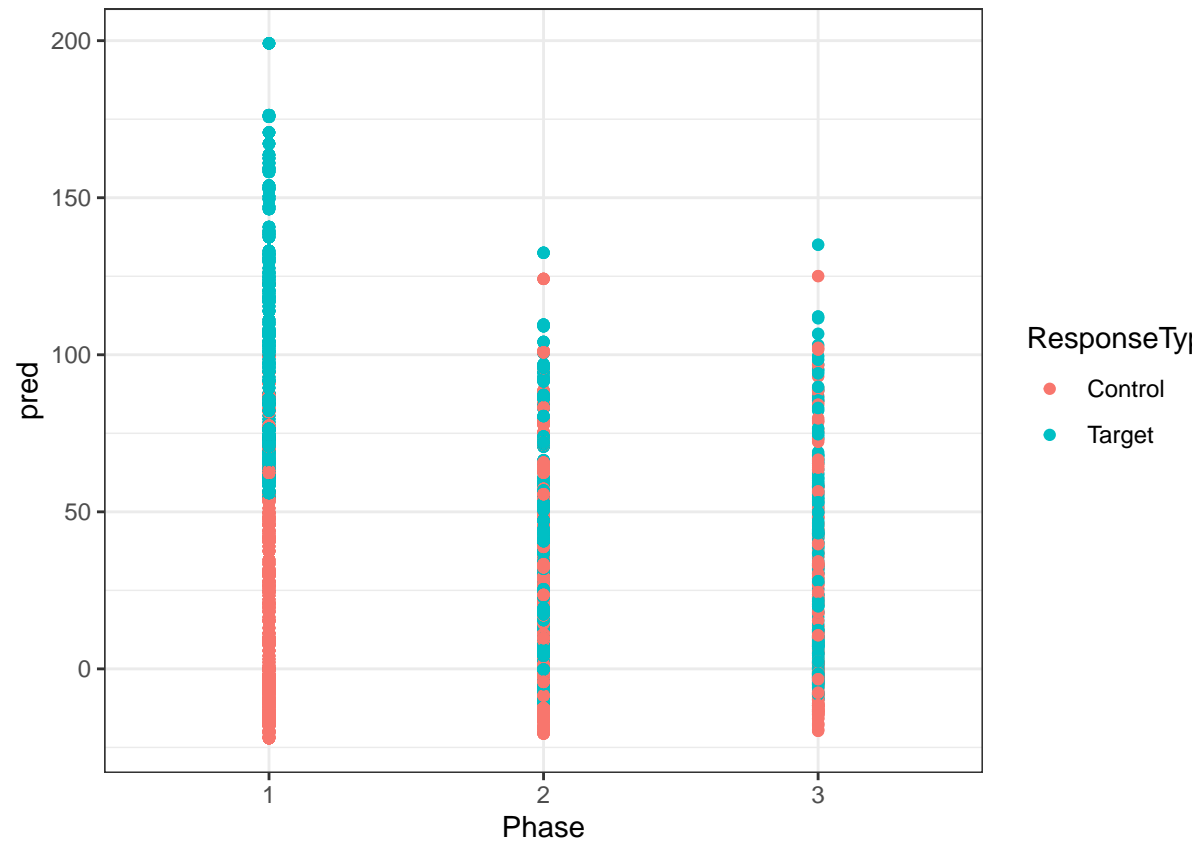
looking @ predictions

'summarise()' has grouped output by 'Phase'. You can override using the '.groups' argument.
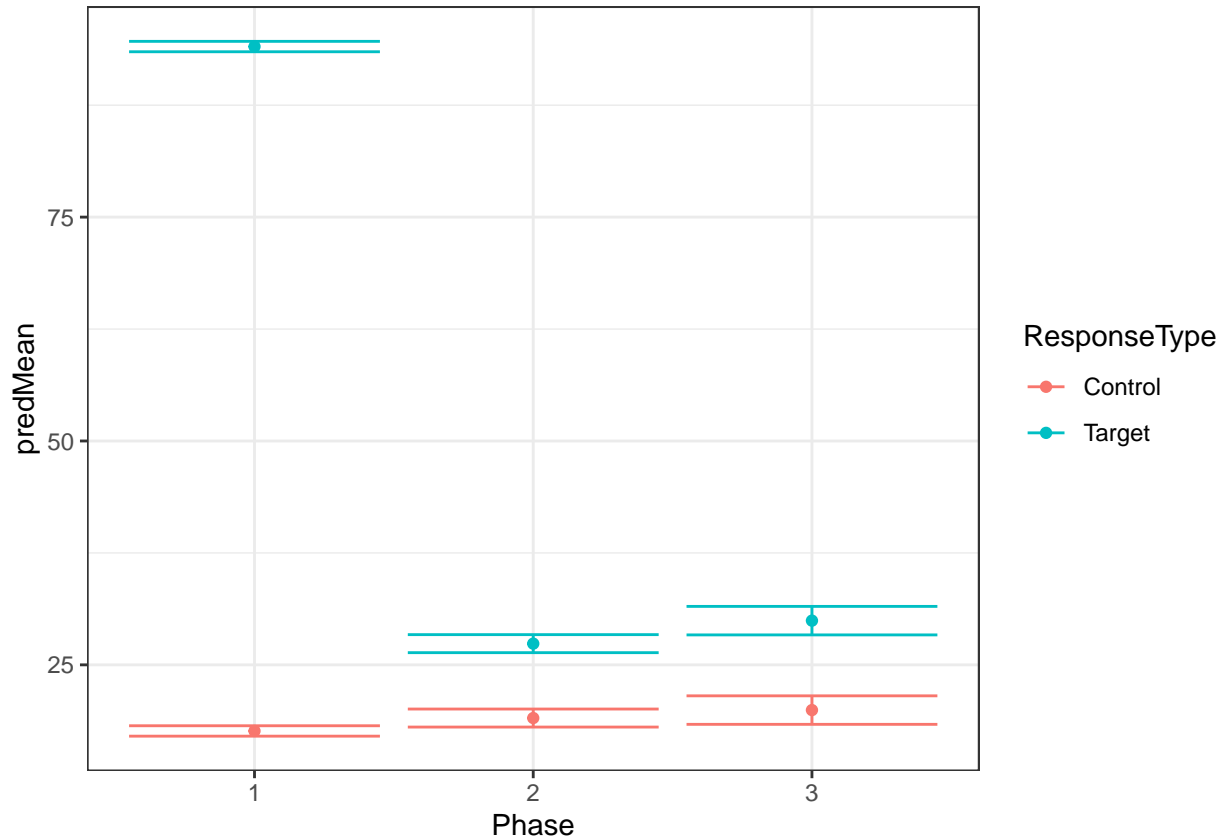
specific comparisons

```
## Note: D.f. calculations have been disabled because the number of observations exceeds 6688.
## To enable adjustments, add the argument 'pbkrtest.limit = 8712' (or larger)
## [or, globally, 'set emm_options(pbkrtest.limit = 8712)' or larger];
## but be warned that this may result in large computation time and memory use.


## Note: D.f. calculations have been disabled because the number of observations exceeds 3000.
## To enable adjustments, add the argument 'lmerTest.limit = 8712' (or larger)
## [or, globally, 'set emm_options(lmerTest.limit = 8712)' or larger];
## but be warned that this may result in large computation time and memory use.


## $emmeans
## ResponseType = Control:
##  Phase emmean   SE  df asymp.LCL asymp.UCL
##  1       17.6 2.46 Inf      12.8      22.4
##  2       19.1 2.76 Inf      13.7      24.5
##  3       19.9 3.33 Inf      13.4      26.5
##
## ResponseType = Target:
##  Phase emmean   SE  df asymp.LCL asymp.UCL
##  1       94.0 2.46 Inf      89.2      98.9
##  2       27.4 2.76 Inf      22.0      32.8
##  3       29.9 3.33 Inf      23.4      36.5
##
## Degrees-of-freedom method: asymptotic
```

```
## Confidence level used: 0.95
##
## $contrasts
## ResponseType = Control:
##  contrast estimate   SE  df z.ratio p.value
##  1 - 2       -1.443 1.75 Inf -0.822  0.4109
##  1 - 3       -2.332 2.56 Inf -0.912  0.3620
##  2 - 3       -0.889 2.84 Inf -0.313  0.7545
##
## ResponseType = Target:
##  contrast estimate   SE  df z.ratio p.value
##  1 - 2       66.680 1.75 Inf 38.002  <.0001
##  1 - 3       64.112 2.56 Inf 25.065  <.0001
##  2 - 3       -2.568 2.84 Inf -0.903  0.3663
##
## Degrees-of-freedom method: asymptotic

## Note: D.f. calculations have been disabled because the number of observations exceeds 6688.
## To enable adjustments, add the argument 'pbkrtest.limit = 8712' (or larger)
## [or, globally, 'set emm_options(pbkrtest.limit = 8712)' or larger];
## but be warned that this may result in large computation time and memory use.
## Note: D.f. calculations have been disabled because the number of observations exceeds 3000.
## To enable adjustments, add the argument 'lmerTest.limit = 8712' (or larger)
## [or, globally, 'set emm_options(lmerTest.limit = 8712)' or larger];
## but be warned that this may result in large computation time and memory use.


## $emmeans
## Phase = 1:
##  ResponseType emmean   SE  df asymp.LCL asymp.UCL
##  Control        17.6 2.46 Inf      12.8      22.4
##  Target         94.0 2.46 Inf      89.2      98.9
##
## Phase = 2:
##  ResponseType emmean   SE  df asymp.LCL asymp.UCL
##  Control        19.1 2.76 Inf      13.7      24.5
##  Target         27.4 2.76 Inf      22.0      32.8
##
## Phase = 3:
##  ResponseType emmean   SE  df asymp.LCL asymp.UCL
##  Control        19.9 3.33 Inf      13.4      26.5
##  Target         29.9 3.33 Inf      23.4      36.5
##
## Degrees-of-freedom method: asymptotic
## Confidence level used: 0.95
##
## $contrasts
## Phase = 1:
##  contrast          estimate   SE  df z.ratio p.value
##  Control - Target    -76.43 1.24 Inf -61.602 <.0001
##
## Phase = 2:
##  contrast          estimate   SE  df z.ratio p.value
##  Control - Target     -8.31 2.15 Inf  -3.866 0.0001
##
```

```
## Phase = 3:
##  contrast          estimate   SE  df z.ratio p.value
##  Control - Target     -9.99 3.40 Inf  -2.939 0.0033
##
## Degrees-of-freedom method: asymptotic
```

Conclusion: No statistically significant increases in control responses from Phase 2 to Phase 3. Control responses remained low throughout the experiment.