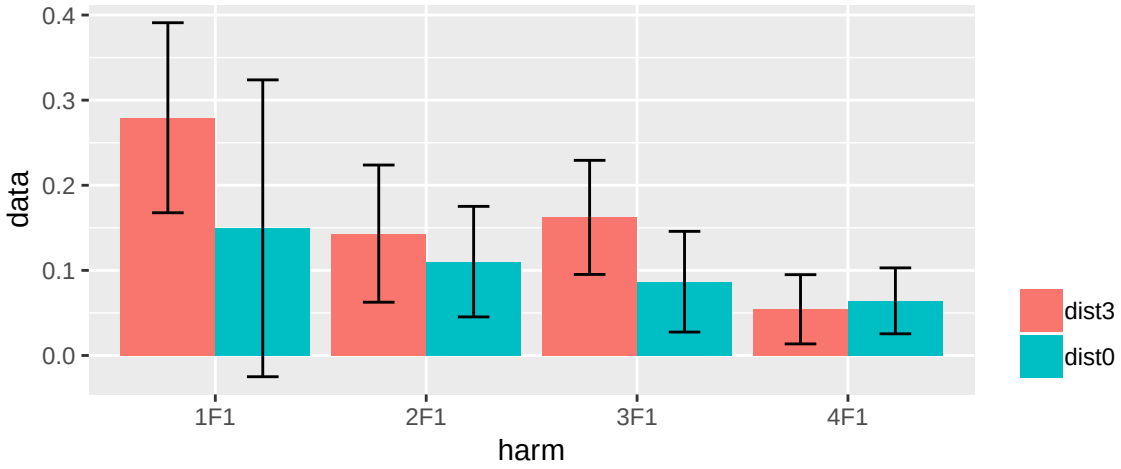
NUMEROSITY ANALYSIS RESULTS

```
top_folder = '/Users/kohler/Dropbox/WRITING/Articles/2019_KohlerNumerositySSVEP/figures/results/experiment1'
counter = 0
for (f in c(1,2,3)) {
  for (q in c(1,2,3,4)) {
    cur_file = switch(q, "RLS_oddball_rc1_freq", "RLS_carrier_rc1_freq", "RLS_oddball_rc2_freq", "RLS_carrier_rc
    cur_csv <- sprintf('%s/%s%d_full_projected_all_trials.csv', top_folder, cur_file, f)
    cur_data <-data.frame( read.csv(file = cur_csv ) )
    cur_data$cond <- factor(cur_data$condition, levels(cur_data$condition)[c(2,1)])
    cur_data$harm <- cur_data$harmonic
    cur_data$harm_alt <- factor(cur_data$harmonic, levels(cur_data$harmonic)[c(2,1,3,4)])
    g <- ggplot(cur_data, aes(harm, data, fill = cond)) +
      stat_summary(geom = "bar", fun.y = mean, position=position_dodge()) +
      stat_summary(geom = "errorbar", fun.data = mean_se, width=.3, position=position_dodge(.9))
    g <- g + theme(legend.title=element_blank(),
      legend.justification=c(1,0),
      legend.background = element_blank()) +
      ggtitle(toupper(sprintf('%s%d\n',cur_file, f)))
    if (q == 1 && f == 1) {
      cat("RESULTS BELOW\n  ")
      cat("\n  ")
    }
    print(g)
    m1 <- lmer(data ~ cond * harm + (1|subject), cur_data)
    emm = emmeans(m1, ~ cond * harm, lmer.df = "satterthwaite")
    m2 <- lmer(data ~ cond + harm + (1|subject), cur_data)
    if (isSingular(m1)) {
      if (isSingular(m2)) {
        cat("WARNING: BOTH MODELS ARE SINGULAR!\n\n")
      } else {
        cat("WARNING: MODEL1 IS SINGULAR, BUT MODEL2 IS NOT!\n\n")
      }
    } else {
      cat("LOVELY: NONE OF THE MODELS ARE SINGULAR!\n\n")
    }
    cat("ANOVA TEST FOR MAIN EFFECTS AND INTERACTIONS\n")
    print(anova(m1), type='pdf')
    cat("\nSUMMARY AND POST-HOC TESTS, harm1 baseline \n")
    print(prettify(summary(m1)), type='pdf')
    cat("\nESTIMATED MARGINAL MEANS, SIMPLE MAIN EFFECTS OF CONDITION WITHOUT CORRECTION\n")
    print(prettify(summary(pairs(emm, simple = "cond", adjust = "none"))))
    cat("\nTEST OF WHETHER OR NOT THE INTERACTION PROVIDES A BETTER FIT\n")
    print(anova(m1, m2))
  }
}
```

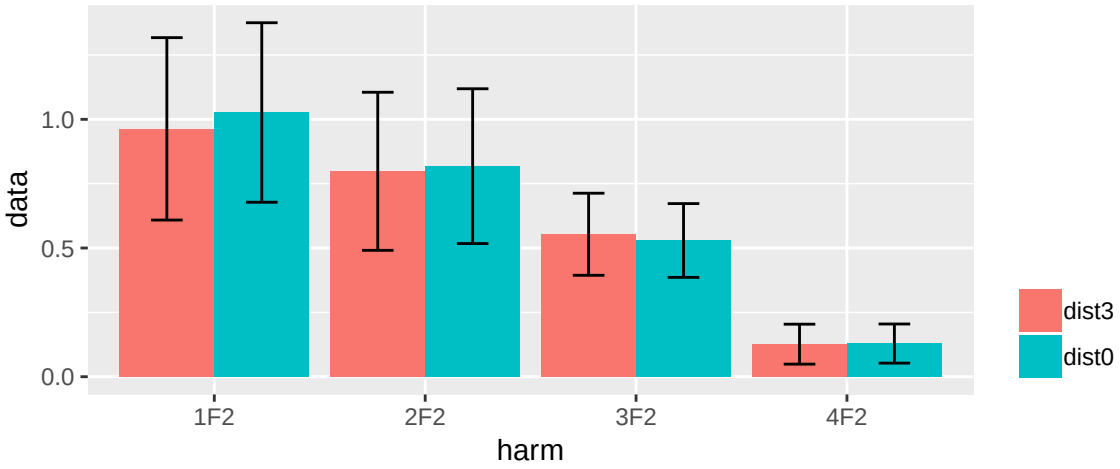
```
## RESULTS BELOW
##
##
```

RLS_ODDBALL_RC1_FREQ1



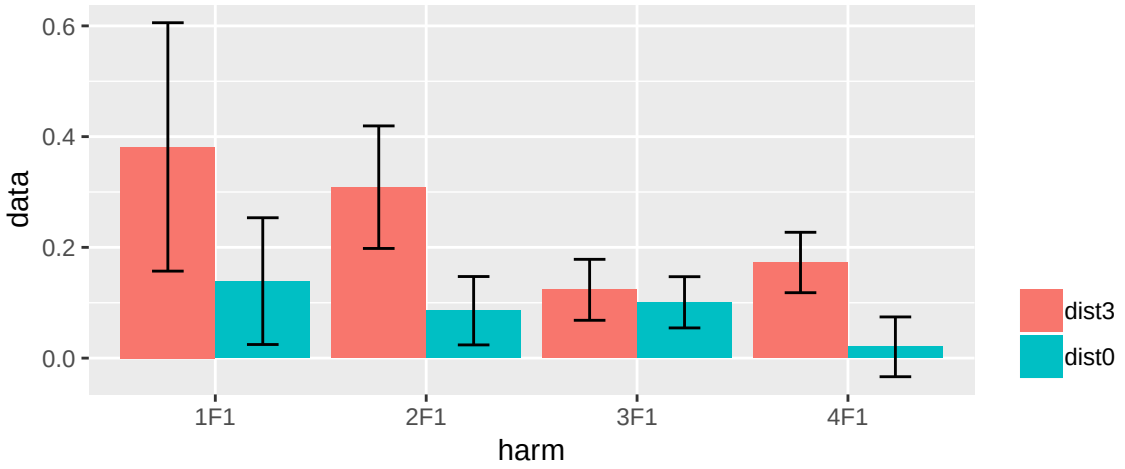

```
## LOVELY: NONE OF THE MODELS ARE SINGULAR!
##
## ANOVA TEST FOR MAIN EFFECTS AND INTERACTIONS
## Type III Analysis of Variance Table with Satterthwaite's method
##            Sum Sq  Mean Sq NumDF DenDF F value Pr(>F)
## cond      0.09788 0.097884     1    98  0.8545 0.3576
## harm      0.36494 0.121647     3    98  1.0619 0.3689
## cond:harm 0.08039 0.026798     3    98  0.2339 0.8725
##
## SUMMARY AND POST-HOC TESTS, harm1 baseline
##                         Estimate CI (lower) CI (upper) Std. Error       df    t value Pr(>|t|)
## 1       (Intercept)  0.27934057  0.1075994 0.45108174 0.08995827 109.5711  3.1052240    0.002  **
## 2       cond: dist0 -0.12991475 -0.3660875 0.10625794 0.12358880  98.0000 -1.0511855    0.296
## 3         harm: 2F1 -0.13616544 -0.3723381 0.10000726 0.12358880  98.0000 -1.1017619    0.273
## 4         harm: 3F1 -0.11709571 -0.3532684 0.11907699 0.12358880  98.0000 -0.9474622    0.346
## 5         harm: 4F1 -0.22506834 -0.4612410 0.01110436 0.12358880  98.0000 -1.8211063    0.072   .
## 6 conddist0:harm2F1  0.09700227 -0.2369964 0.43100091 0.17478096  98.0000  0.5549934     0.58
## 7 conddist0:harm3F1  0.05434280 -0.2796558 0.38834143 0.17478096  98.0000  0.3109194    0.757
## 8 conddist0:harm4F1  0.13982982 -0.1941688 0.47382845 0.17478096  98.0000  0.8000289    0.426
##
## ESTIMATED MARGINAL MEANS, SIMPLE MAIN EFFECTS OF CONDITION WITHOUT CORRECTION
##          contrast harm     estimate        SE df     t.ratio   p.value
## 1 1 dist3 - dist0  1F1  0.129914754 0.1235888 98  1.05118549 0.2957586
## 2 2 dist3 - dist0  2F1  0.032912481 0.1235888 98  0.26630634 0.7905628
## 3 3 dist3 - dist0  3F1  0.075571958 0.1235888 98  0.61147902 0.5422984
## 4 4 dist3 - dist0  4F1 -0.009915065 0.1235888 98 -0.08022624 0.9362209
##
## TEST OF WHETHER OR NOT THE INTERACTION PROVIDES A BETTER FIT
## Data: cur_data
## Models:
## m2: data ~ cond + harm + (1 | subject)
## m1: data ~ cond * harm + (1 | subject)
##    Df    AIC    BIC  logLik deviance  Chisq Chi Df Pr(>Chisq)
## m2  7 92.863 112.38 -39.432   78.863
## m1 10 98.114 125.99 -39.057   78.114 0.7492      3     0.8616
```

RLS_CARRIER_RC1_FREQ1



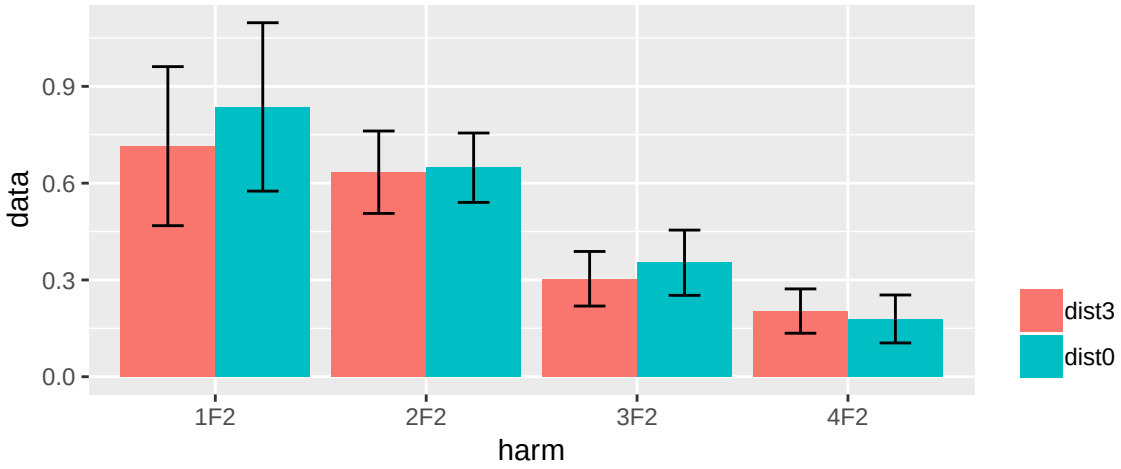

```
## LOVELY: NONE OF THE MODELS ARE SINGULAR!
##
## ANOVA TEST FOR MAIN EFFECTS AND INTERACTIONS
## Type III Analysis of Variance Table with Satterthwaite's method
##            Sum Sq Mean Sq NumDF DenDF F value   Pr(>F)
## cond       0.0071  0.0071     1    98  0.0095 0.922643
## harm      12.7300  4.2433     3    98  5.6478 0.001302 **
## cond:harm  0.0306  0.0102     3    98  0.0136 0.997829
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## SUMMARY AND POST-HOC TESTS, harm1 baseline
##                         Estimate CI (lower) CI (upper) Std. Error       df     t value Pr(>|t|)
## 1       (Intercept)  0.96298678  0.4898412  1.4361323  0.2473815 91.00598  3.89271989   <0.001 ***
## 2       cond: dist0  0.06353203 -0.5412967  0.6683608  0.3165059 98.00000  0.20072935    0.841
## 3         harm: 2F2 -0.16495070 -0.7697794  0.4398780  0.3165059 98.00000 -0.52116148    0.603
## 4         harm: 3F2 -0.40954496 -1.0143737  0.1952838  0.3165059 98.00000 -1.29395670    0.199
## 5         harm: 4F2 -0.83643821 -1.4412670 -0.2316095  0.3165059 98.00000 -2.64272527     0.01  **
## 6 conddist0:harm2F2 -0.04355086 -0.8989079  0.8118062  0.4476070 98.00000 -0.09729711    0.923
## 7 conddist0:harm3F2 -0.08769742 -0.9430544  0.7676596  0.4476070 98.00000 -0.19592506    0.845
## 8 conddist0:harm4F2 -0.06125273 -0.9166097  0.7941043  0.4476070 98.00000 -0.13684490    0.891
##
## ESTIMATED MARGINAL MEANS, SIMPLE MAIN EFFECTS OF CONDITION WITHOUT CORRECTION
##          contrast harm     estimate        SE df      t.ratio   p.value
## 1 1 dist3 - dist0  1F2 -0.063532028 0.3165059 98 -0.200729348 0.8413262
## 2 2 dist3 - dist0  2F2 -0.019981164 0.3165059 98 -0.063130456 0.9497912
## 3 3 dist3 - dist0  3F2  0.024165395 0.3165059 98  0.076350528 0.9392959
## 4 4 dist3 - dist0  4F2 -0.002279296 0.3165059 98 -0.007201433 0.9942688
##
## TEST OF WHETHER OR NOT THE INTERACTION PROVIDES A BETTER FIT
## Data: cur_data
## Models:
## m2: data ~ cond + harm + (1 | subject)
## m1: data ~ cond * harm + (1 | subject)
##    Df    AIC    BIC  logLik deviance  Chisq Chi Df Pr(>Chisq)
## m2  7 327.31 346.82 -156.65   313.31
## m1 10 333.26 361.14 -156.63   313.26 0.0436      3     0.9976
```

RLS_ODDBALL_RC2_FREQ1



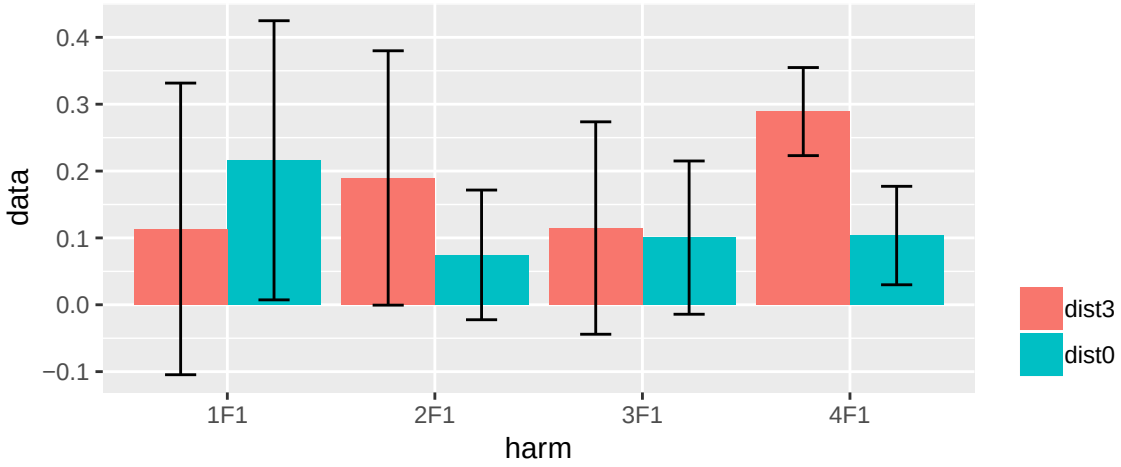

```
## LOVELY: NONE OF THE MODELS ARE SINGULAR!
##
## ANOVA TEST FOR MAIN EFFECTS AND INTERACTIONS
## Type III Analysis of Variance Table with Satterthwaite's method
##            Sum Sq Mean Sq NumDF DenDF F value  Pr(>F)
## cond      0.76906 0.76906     1    98  5.0914 0.02627 *
## harm      0.52733 0.17578     3    98  1.1637 0.32761
## cond:harm 0.22286 0.07429     3    98  0.4918 0.68879
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## SUMMARY AND POST-HOC TESTS, harm1 baseline
##                         Estimate CI (lower) CI (upper) Std. Error        df     t value Pr(>|t|)
## 1       (Intercept)  0.38141068  0.1782062 0.58461521  0.1063809 103.22972  3.58532918    0.001 ***
## 2       cond: dist0 -0.24240057 -0.5135967 0.02879553  0.1419165  98.00001 -1.70805083    0.091   .
## 3         harm: 2F1 -0.07270034 -0.3438964 0.19849576  0.1419165  98.00001 -0.51227550     0.61
## 4         harm: 3F1 -0.25804336 -0.5292395 0.01315274  0.1419165  98.00001 -1.81827614    0.072   .
## 5         harm: 4F1 -0.20870907 -0.4799052 0.06248704  0.1419165  98.00001 -1.47064707    0.145
## 6 conddist0:harm2F1  0.01927391 -0.3642553 0.40280311  0.2007002  98.00001  0.09603333    0.924
## 7 conddist0:harm3F1  0.21980930 -0.1637199 0.60333851  0.2007002  98.00001  1.09521206    0.276
## 8 conddist0:harm4F1  0.09007617 -0.2934530 0.47360538  0.2007002  98.00001  0.44880954    0.655
##
## ESTIMATED MARGINAL MEANS, SIMPLE MAIN EFFECTS OF CONDITION WITHOUT CORRECTION
##          contrast harm   estimate        SE       df   t.ratio    p.value
## 1 1 dist3 - dist0  1F1 0.24240057 0.1419165 98.00001 1.7080508 0.09079278
## 2 2 dist3 - dist0  2F1 0.22312666 0.1419165 98.00001 1.5722392 0.11911820
## 3 3 dist3 - dist0  3F1 0.02259127 0.1419165 98.00001 0.1591871 0.87384909
## 4 4 dist3 - dist0  4F1 0.15232440 0.1419165 98.00001 1.0733383 0.28575521
##
## TEST OF WHETHER OR NOT THE INTERACTION PROVIDES A BETTER FIT
## Data: cur_data
## Models:
## m2: data ~ cond + harm + (1 | subject)
## m1: data ~ cond * harm + (1 | subject)
##    Df    AIC    BIC  logLik deviance Chisq Chi Df Pr(>Chisq)
## m2  7 131.34 150.86 -58.672   117.34
## m1 10 135.78 163.65 -57.888   115.78 1.569      3     0.6664
```

RLS_CARRIER_RC2_FREQ1



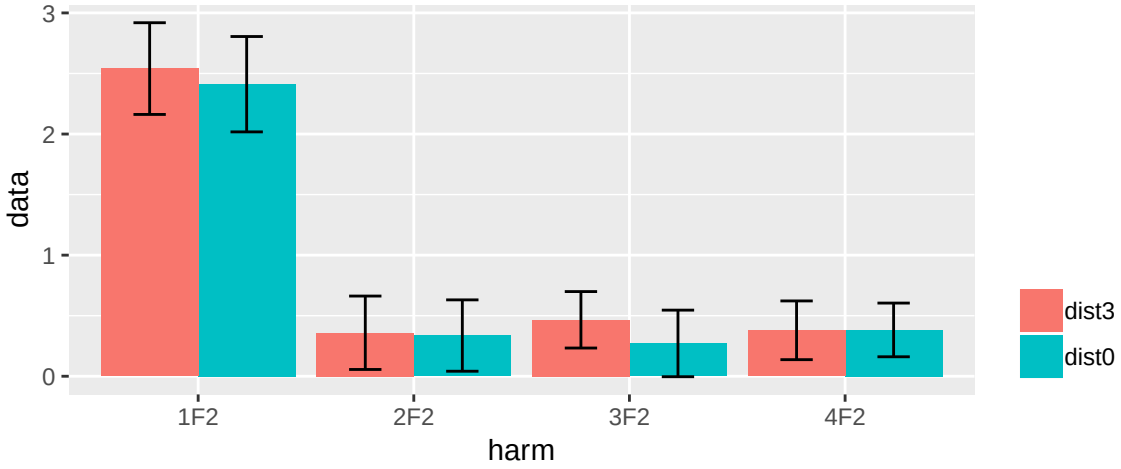

```
## LOVELY: NONE OF THE MODELS ARE SINGULAR!
##
## ANOVA TEST FOR MAIN EFFECTS AND INTERACTIONS
## Type III Analysis of Variance Table with Satterthwaite's method
##           Sum Sq Mean Sq NumDF DenDF F value    Pr(>F)
## cond      0.0485 0.04845     1    98  0.2443    0.6223
## harm      6.5835 2.19452     3    98 11.0628 2.558e-06 ***
## cond:harm 0.0870 0.02900     3    98  0.1462    0.9319
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## SUMMARY AND POST-HOC TESTS, harm1 baseline
##                         Estimate CI (lower) CI (upper) Std. Error       df    t value Pr(>|t|)
## 1       (Intercept)  0.71467301  0.4215977  1.0077483  0.1518050 49.31469  4.7078373   <0.001 ***
## 2       cond: dist0  0.12164053 -0.1891423  0.4324233  0.1626321 98.00000  0.7479489    0.456
## 3         harm: 2F2 -0.08075299 -0.3915358  0.2300298  0.1626321 98.00000 -0.4965377    0.621
## 4         harm: 3F2 -0.41099479 -0.7217776 -0.1002120  0.1626321 98.00000 -2.5271438    0.013   *
## 5         harm: 4F2 -0.51114395 -0.8219267 -0.2003612  0.1626321 98.00000 -3.1429456    0.002  **
## 6 conddist0:harm2F2 -0.10768145 -0.5471947  0.3318318  0.2299966 98.00000 -0.4681872    0.641
## 7 conddist0:harm3F2 -0.07197366 -0.5114869  0.3675396  0.2299966 98.00000 -0.3129336    0.755
## 8 conddist0:harm4F2 -0.14615290 -0.5856661  0.2933603  0.2299966 98.00000 -0.6354569    0.527
##
## ESTIMATED MARGINAL MEANS, SIMPLE MAIN EFFECTS OF CONDITION WITHOUT CORRECTION
##          contrast harm    estimate        SE df     t.ratio   p.value
## 1 1 dist3 - dist0  1F2 -0.12164053 0.1626321 98 -0.74794889 0.4562821
## 2 2 dist3 - dist0  2F2 -0.01395908 0.1626321 98 -0.08583222 0.9317749
## 3 3 dist3 - dist0  3F2 -0.04966687 0.1626321 98 -0.30539393 0.7607139
## 4 4 dist3 - dist0  4F2  0.02451237 0.1626321 98  0.15072281 0.8805042
##
## TEST OF WHETHER OR NOT THE INTERACTION PROVIDES A BETTER FIT
## Data: cur_data
## Models:
## m2: data ~ cond + harm + (1 | subject)
## m1: data ~ cond * harm + (1 | subject)
##    Df    AIC    BIC  logLik deviance  Chisq Chi Df Pr(>Chisq)
## m2  7 181.68 201.19 -83.840   167.68
## m1 10 187.21 215.09 -83.606   167.21 0.4688      3     0.9257
```

RLS_ODDBALL_RC1_FREQ2

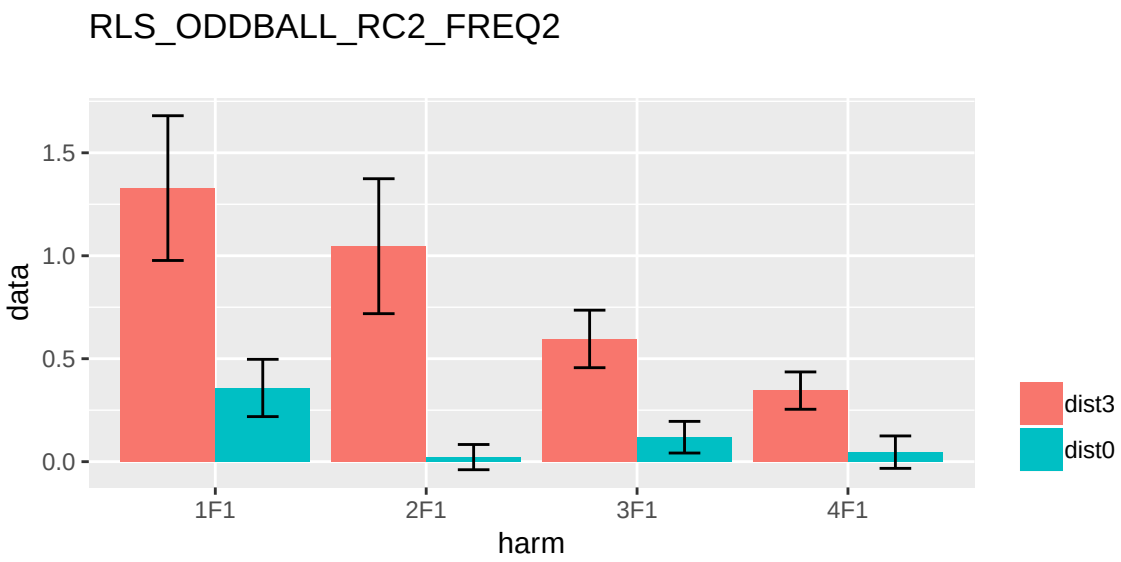



```
## WARNING: BOTH MODELS ARE SINGULAR!
##
## ANOVA TEST FOR MAIN EFFECTS AND INTERACTIONS
## Type III Analysis of Variance Table with Satterthwaite's method
##            Sum Sq  Mean Sq NumDF DenDF F value Pr(>F)
## cond      0.08441 0.084410     1   112  0.2435 0.6227
## harm      0.13419 0.044729     3   112  0.1290 0.9427
## cond:harm 0.35327 0.117756     3   112  0.3397 0.7967
##
## SUMMARY AND POST-HOC TESTS, harm1 baseline
##                          Estimate CI (lower) CI (upper) Std. Error  df      t value Pr(>|t|)
## 1       (Intercept)  0.113480433 -0.1766880  0.4036488  0.1520193 112  0.746486770    0.457
## 2       cond: dist0  0.102632942 -0.3077271  0.5129930  0.2149878 112  0.477389555    0.634
## 3         harm: 2F1  0.076183523 -0.3341766  0.4865436  0.2149878 112  0.354362033    0.724
## 4         harm: 3F1  0.001323907 -0.4090362  0.4116840  0.2149878 112  0.006158057    0.995
## 5         harm: 4F1  0.175495648 -0.2348644  0.5858557  0.2149878 112  0.816305053    0.416
## 6 conddist0:harm2F1 -0.217681293 -0.7980181  0.3626555  0.3040387 112 -0.715965742    0.476
## 7 conddist0:harm3F1 -0.116970189 -0.6973070  0.4633666  0.3040387 112 -0.384721383    0.701
## 8 conddist0:harm4F1 -0.288055818 -0.8683926  0.2922810  0.3040387 112 -0.947431427    0.345
##
## ESTIMATED MARGINAL MEANS, SIMPLE MAIN EFFECTS OF CONDITION WITHOUT CORRECTION
##          contrast harm    estimate        SE  df     t.ratio   p.value
## 1 1 dist3 - dist0  1F1 -0.10263294 0.2149878 112 -0.47738956 0.6340150
## 2 2 dist3 - dist0  2F1  0.11504835 0.2149878 112  0.53513891 0.5936147
## 3 3 dist3 - dist0  3F1  0.01433725 0.2149878 112  0.06668864 0.9469485
## 4 4 dist3 - dist0  4F1  0.18542288 0.2149878 112  0.86248082 0.3902660
##
## TEST OF WHETHER OR NOT THE INTERACTION PROVIDES A BETTER FIT
## Data: cur_data
## Models:
## m2: data ~ cond + harm + (1 | subject)
## m1: data ~ cond * harm + (1 | subject)
##    Df    AIC    BIC  logLik deviance  Chisq Chi Df Pr(>Chisq)
## m2  7 220.22 239.73 -103.11   206.22
## m1 10 225.13 253.01 -102.57   205.13 1.0869      3     0.7802
```

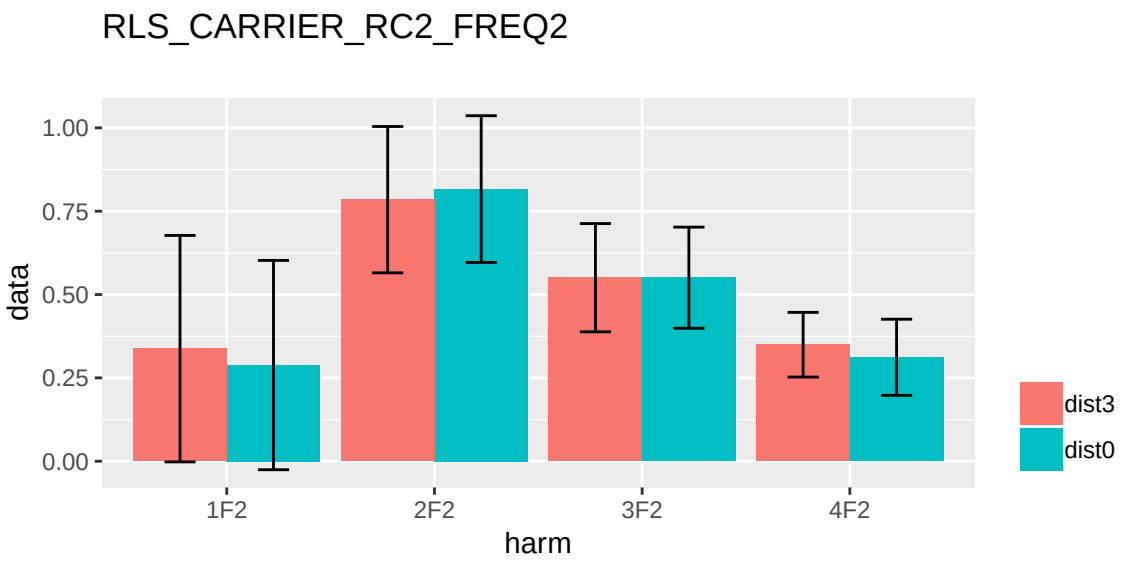
RLS_CARRIER_RC1_FREQ2




```
## LOVELY: NONE OF THE MODELS ARE SINGULAR!
##
## ANOVA TEST FOR MAIN EFFECTS AND INTERACTIONS
## Type III Analysis of Variance Table with Satterthwaite's method
##            Sum Sq Mean Sq NumDF DenDF F value Pr(>F)
## cond        0.222   0.222     1    98  0.3592 0.5503
## harm      100.210  33.403     3    98 54.1051 <2e-16 ***
## cond:harm   0.193   0.064     3    98  0.1040 0.9575
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## SUMMARY AND POST-HOC TESTS, harm1 baseline
##                         Estimate CI (lower) CI (upper) Std. Error       df    t value Pr(>|t|)
## 1       (Intercept)  2.54038011  1.9592824  3.1214778  0.2989531 36.87571  8.4975886   <0.001 ***
## 2       cond: dist0 -0.12893911 -0.6772103  0.4193320  0.2869094 98.00000 -0.4494070    0.654
## 3         harm: 2F2 -2.18135869 -2.7296298 -1.6330875  0.2869094 98.00000 -7.6029523   <0.001 ***
## 4         harm: 3F2 -2.07425738 -2.6225285 -1.5259862  0.2869094 98.00000 -7.2296592   <0.001 ***
## 5         harm: 4F2 -2.16095017 -2.7092213 -1.6126790  0.2869094 98.00000 -7.5318200   <0.001 ***
## 6 conddist0:harm2F2  0.10601906 -0.6693534  0.8813916  0.4057512 98.00000  0.2612908    0.794
## 7 conddist0:harm3F2 -0.06625006 -0.8416226  0.7091224  0.4057512 98.00000 -0.1632775    0.871
## 8 conddist0:harm4F2  0.13206878 -0.6433037  0.9074413  0.4057512 98.00000  0.3254920    0.746
##
## ESTIMATED MARGINAL MEANS, SIMPLE MAIN EFFECTS OF CONDITION WITHOUT CORRECTION
##          contrast harm     estimate        SE df     t.ratio   p.value
## 1 1 dist3 - dist0  1F2  0.128939112 0.2869094 98  0.44940702 0.6541304
## 2 2 dist3 - dist0  2F2  0.022920056 0.2869094 98  0.07988603 0.9364908
## 3 3 dist3 - dist0  3F2  0.195189173 0.2869094 98  0.68031635 0.4979083
## 4 4 dist3 - dist0  4F2 -0.003129672 0.2869094 98 -0.01090822 0.9913188
##
## TEST OF WHETHER OR NOT THE INTERACTION PROVIDES A BETTER FIT
## Data: cur_data
## Models:
## m2: data ~ cond + harm + (1 | subject)
## m1: data ~ cond * harm + (1 | subject)
##    Df    AIC    BIC  logLik deviance  Chisq Chi Df Pr(>Chisq)
## m2  7 323.81 343.33 -154.91   309.81
## m1 10 329.48 357.35 -154.74   309.48 0.3338      3     0.9535
```

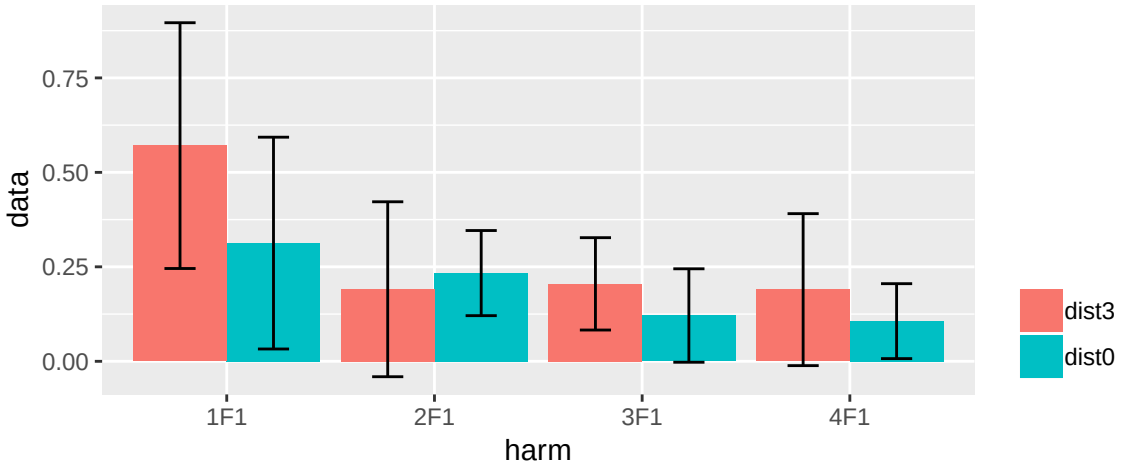



```
## LOVELY: NONE OF THE MODELS ARE SINGULAR!
##
## ANOVA TEST FOR MAIN EFFECTS AND INTERACTIONS
## Type III Analysis of Variance Table with Satterthwaite's method
##            Sum Sq Mean Sq NumDF DenDF F value    Pr(>F)
## cond      14.3998 14.3998     1    98 36.6689 2.587e-08 ***
## harm       6.9221  2.3074     3    98  5.8757 0.0009885 ***
## cond:harm  2.9160  0.9720     3    98  2.4752 0.0659709 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## SUMMARY AND POST-HOC TESTS, harm1 baseline
##                         Estimate  CI (lower) CI (upper) Std. Error      df    t value Pr(>|t|)
## 1       (Intercept)  1.32856811  0.96082060  1.6963156  0.1916760 70.9628  6.9313215   <0.001 ***
## 2       cond: dist0 -0.97070204 -1.40797106 -0.5334330  0.2288222 98.0000 -4.2421676   <0.001 ***
## 3         harm: 2F1 -0.28212313 -0.71939215  0.1551459  0.2288222 98.0000 -1.2329361    0.221
## 4         harm: 3F1 -0.73255725 -1.16982627 -0.2952882  0.2288222 98.0000 -3.2014259    0.002  **
## 5         harm: 4F1 -0.98347598 -1.42074500 -0.5462070  0.2288222 98.0000 -4.2979923   <0.001 ***
## 6 conddist0:harm2F1 -0.05369338 -0.67208516  0.5646984  0.3236034 98.0000 -0.1659234    0.869
## 7 conddist0:harm3F1  0.49344775 -0.12494403  1.1118395  0.3236034 98.0000  1.5248533    0.131
## 8 conddist0:harm4F1  0.67179545  0.05340367  1.2901872  0.3236034 98.0000  2.0759837    0.041   *
##
## ESTIMATED MARGINAL MEANS, SIMPLE MAIN EFFECTS OF CONDITION WITHOUT CORRECTION
##          contrast harm  estimate        SE df  t.ratio      p.value
## 1 1 dist3 - dist0  1F1 0.9707020 0.2288222 98 4.242168 5.024774e-05
## 2 2 dist3 - dist0  2F1 1.0243954 0.2288222 98 4.476819 2.048437e-05
## 3 3 dist3 - dist0  3F1 0.4772543 0.2288222 98 2.085699 3.960385e-02
## 4 4 dist3 - dist0  4F1 0.2989066 0.2288222 98 1.306283 1.945138e-01
##
## TEST OF WHETHER OR NOT THE INTERACTION PROVIDES A BETTER FIT
## Data: cur_data
## Models:
## m2: data ~ cond + harm + (1 | subject)
## m1: data ~ cond * harm + (1 | subject)
##    Df    AIC    BIC  logLik deviance  Chisq Chi Df Pr(>Chisq)
## m2  7 263.39 282.9 -124.69   249.39
## m1 10 261.72 289.6 -120.86   241.72 7.6689      3    0.05337 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```



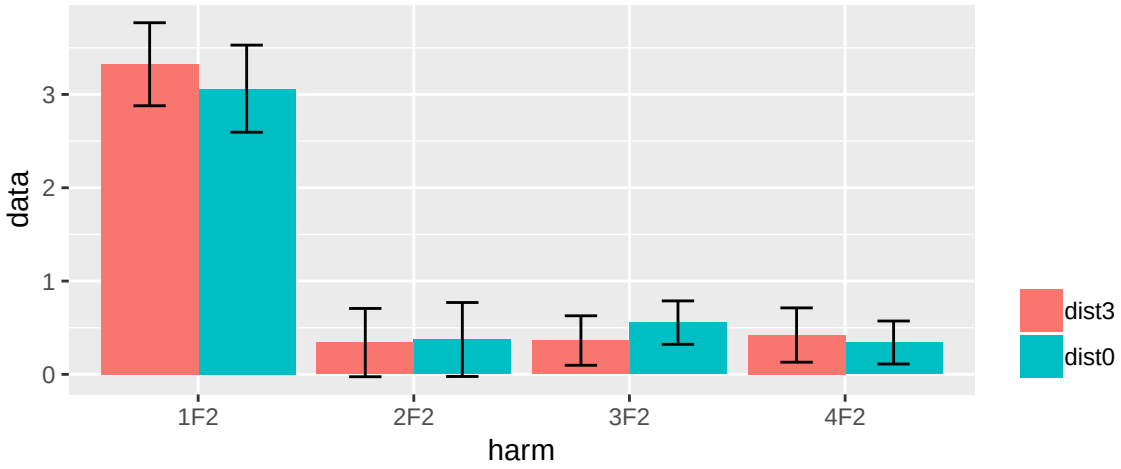

```
## LOVELY: NONE OF THE MODELS ARE SINGULAR!
##
## ANOVA TEST FOR MAIN EFFECTS AND INTERACTIONS
## Type III Analysis of Variance Table with Satterthwaite's method
##           Sum Sq Mean Sq NumDF DenDF F value  Pr(>F)
## cond      0.0057 0.00569     1    98  0.0108 0.91727
## harm      4.6929 1.56429     3    98  2.9821 0.03504 *
## cond:harm 0.0308 0.01027     3    98  0.0196 0.99626
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## SUMMARY AND POST-HOC TESTS, harm1 baseline
##                         Estimate  CI (lower) CI (upper) Std. Error       df     t value Pr(>|t|)
## 1       (Intercept)  0.33771659 -0.08142948  0.7568627  0.2186125 74.47794  1.54481859    0.127
## 2       cond: dist0 -0.04926225 -0.55463799  0.4561135  0.2644623 98.00000 -0.18627321    0.853
## 3         harm: 2F2  0.44682303 -0.05855271  0.9521988  0.2644623 98.00000  1.68955270    0.094    .
## 4         harm: 3F2  0.21281250 -0.29256324  0.7181882  0.2644623 98.00000  0.80469874    0.423
## 5         harm: 4F2  0.01184858 -0.49352716  0.5172243  0.2644623 98.00000  0.04480254    0.964
## 6 conddist0:harm2F2  0.08110874 -0.63360049  0.7958180  0.3740062 98.00000  0.21686468    0.829
## 7 conddist0:harm3F2  0.04933100 -0.66537822  0.7640402  0.3740062 98.00000  0.13189889    0.895
## 8 conddist0:harm4F2  0.01152326 -0.70318597  0.7262325  0.3740062 98.00000  0.03081034    0.975
##
## ESTIMATED MARGINAL MEANS, SIMPLE MAIN EFFECTS OF CONDITION WITHOUT CORRECTION
##          contrast harm      estimate        SE df       t.ratio   p.value
## 1 1 dist3 - dist0  1F2  4.926225e-02 0.2644623 98  0.1862732143 0.8526156
## 2 2 dist3 - dist0  2F2 -3.184649e-02 0.2644623 98 -0.1204197613 0.9043972
## 3 3 dist3 - dist0  3F2 -6.875734e-05 0.2644623 98 -0.0002599892 0.9997931
## 4 4 dist3 - dist0  4F2  3.773899e-02 0.2644623 98  0.1427008163 0.8868195
##
## TEST OF WHETHER OR NOT THE INTERACTION PROVIDES A BETTER FIT
## Data: cur_data
## Models:
## m2: data ~ cond + harm + (1 | subject)
## m1: data ~ cond * harm + (1 | subject)
##    Df    AIC    BIC  logLik deviance  Chisq Chi Df Pr(>Chisq)
## m2  7 289.44 308.96 -137.72   275.44
## m1 10 295.38 323.26 -137.69   275.38 0.0629      3     0.9959
```

RLS_ODDBALL_RC1_FREQ3



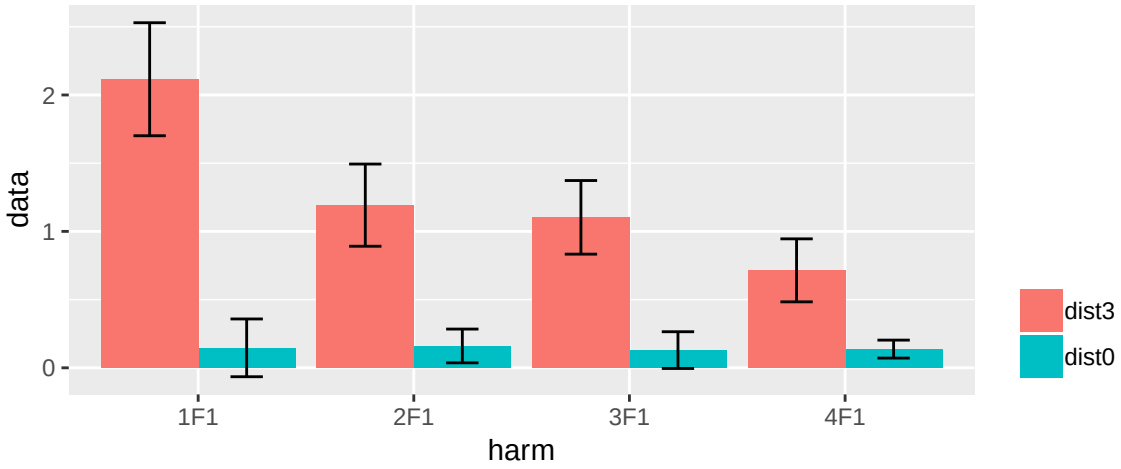

```
## LOVELY: NONE OF THE MODELS ARE SINGULAR!
##
## ANOVA TEST FOR MAIN EFFECTS AND INTERACTIONS
## Type III Analysis of Variance Table with Satterthwaite's method
##            Sum Sq Mean Sq NumDF DenDF F value Pr(>F)
## cond      0.27425 0.27425     1    98  0.4980 0.4820
## harm      1.67684 0.55895     3    98  1.0151 0.3895
## cond:harm 0.34356 0.11452     3    98  0.2080 0.8907
##
## SUMMARY AND POST-HOC TESTS, harm1 baseline
##                         Estimate CI (lower) CI (upper) Std. Error       df    t value Pr(>|t|)
## 1       (Intercept)  0.5708103  0.1821837  0.9594370  0.2034444 102.7994  2.8057312    0.006  **
## 2       cond: dist0 -0.2579961 -0.7757877  0.2597954  0.2709595  98.0000 -0.9521575    0.343
## 3         harm: 2F1 -0.3801314 -0.8979229  0.1376602  0.2709595  98.0000 -1.4029084    0.164
## 4         harm: 3F1 -0.3658424 -0.8836340  0.1519492  0.2709595  98.0000 -1.3501736     0.18
## 5         harm: 4F1 -0.3811518 -0.8989434  0.1366398  0.2709595  98.0000 -1.4066744    0.163
## 6 conddist0:harm2F1  0.3007711 -0.4314968  1.0330390  0.3831946  98.0000  0.7849043    0.434
## 7 conddist0:harm3F1  0.1741781 -0.5580898  0.9064460  0.3831946  98.0000  0.4545421     0.65
## 8 conddist0:harm4F1  0.1745892 -0.5576787  0.9068570  0.3831946  98.0000  0.4556149     0.65
##
## ESTIMATED MARGINAL MEANS, SIMPLE MAIN EFFECTS OF CONDITION WITHOUT CORRECTION
##          contrast harm    estimate        SE df    t.ratio   p.value
## 1 1 dist3 - dist0  1F1  0.25799614 0.2709595 98  0.9521575 0.3433596
## 2 2 dist3 - dist0  2F1 -0.04277496 0.2709595 98 -0.1578648 0.8748882
## 3 3 dist3 - dist0  3F1  0.08381804 0.2709595 98  0.3093379 0.7577213
## 4 4 dist3 - dist0  4F1  0.08340697 0.2709595 98  0.3078208 0.7588720
##
## TEST OF WHETHER OR NOT THE INTERACTION PROVIDES A BETTER FIT
## Data: cur_data
## Models:
## m2: data ~ cond + harm + (1 | subject)
## m1: data ~ cond * harm + (1 | subject)
##    Df    AIC    BIC  logLik deviance  Chisq Chi Df Pr(>Chisq)
## m2  7 285.88 305.39 -135.94   271.88
## m1 10 291.21 319.09 -135.61   271.21 0.6664      3     0.8811
```

RLS_CARRIER_RC1_FREQ3



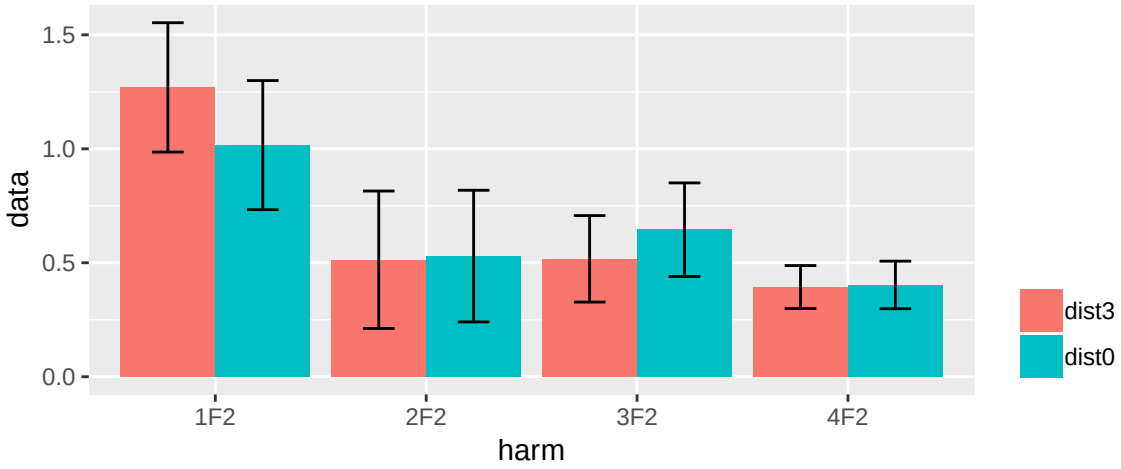

```
## LOVELY: NONE OF THE MODELS ARE SINGULAR!
##
## ANOVA TEST FOR MAIN EFFECTS AND INTERACTIONS
## Type III Analysis of Variance Table with Satterthwaite's method
##            Sum Sq Mean Sq NumDF DenDF F value Pr(>F)
## cond        0.026   0.026     1    98  0.0218 0.8829
## harm      175.800  58.600     3    98 50.0638 <2e-16 ***
## cond:harm   0.822   0.274     3    98  0.2341 0.8724
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## SUMMARY AND POST-HOC TESTS, harm1 baseline
##                        Estimate CI (lower) CI (upper) Std. Error       df    t value Pr(>|t|)
## 1       (Intercept)  3.3238682  2.6543570   3.993379  0.3479948 59.40724  9.5514890   <0.001 ***
## 2       cond: dist0 -0.2619387 -1.0168694   0.492992  0.3950540 98.00000 -0.6630451    0.509
## 3         harm: 2F2 -2.9833836 -3.7383143  -2.228453  0.3950540 98.00000 -7.5518365   <0.001 ***
## 4         harm: 3F2 -2.9613562 -3.7162869  -2.206426  0.3950540 98.00000 -7.4960787   <0.001 ***
## 5         harm: 4F2 -2.9024774 -3.6574081  -2.147547  0.3950540 98.00000 -7.3470387   <0.001 ***
## 6 conddist0:harm2F2  0.2951744 -0.7724588   1.362808  0.5586908 98.00000  0.5283323    0.598
## 7 conddist0:harm3F2  0.4539981 -0.6136352   1.521631  0.5586908 98.00000  0.8126107    0.418
## 8 conddist0:harm4F2  0.1818761 -0.8857572   1.249509  0.5586908 98.00000  0.3255398    0.745
##
## ESTIMATED MARGINAL MEANS, SIMPLE MAIN EFFECTS OF CONDITION WITHOUT CORRECTION
##          contrast harm    estimate       SE df     t.ratio   p.value
## 1 1 dist3 - dist0  1F2  0.26193867 0.395054 98  0.66304515 0.5088582
## 2 2 dist3 - dist0  2F2 -0.03323574 0.395054 98 -0.08412961 0.9331250
## 3 3 dist3 - dist0  3F2 -0.19205942 0.395054 98 -0.48615987 0.6279392
## 4 4 dist3 - dist0  4F2  0.08006260 0.395054 98  0.20266241 0.8398191
##
## TEST OF WHETHER OR NOT THE INTERACTION PROVIDES A BETTER FIT
## Data: cur_data
## Models:
## m2: data ~ cond + harm + (1 | subject)
## m1: data ~ cond * harm + (1 | subject)
##    Df    AIC    BIC  logLik deviance  Chisq Chi Df Pr(>Chisq)
## m2  7 391.25 410.76 -188.62   377.25
## m1 10 396.50 424.37 -188.25   376.50 0.7498      3     0.8614
```

RLS_ODDBALL_RC2_FREQ3




```
## LOVELY: NONE OF THE MODELS ARE SINGULAR!
##
## ANOVA TEST FOR MAIN EFFECTS AND INTERACTIONS
## Type III Analysis of Variance Table with Satterthwaite's method
##           Sum Sq Mean Sq NumDF DenDF F value    Pr(>F)
## cond      38.845  38.845     1    98 61.7888 5.026e-12 ***
## harm       8.033   2.678     3    98  4.2594  0.007142 **
## cond:harm  7.825   2.608     3    98  4.1489  0.008190 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## SUMMARY AND POST-HOC TESTS, harm1 baseline
##                        Estimate CI (lower) CI (upper) Std. Error       df   t value Pr(>|t|)
## 1       (Intercept)  2.1153118  1.6497130  2.5809106  0.2426701 70.80673  8.716821   <0.001 ***
## 2       cond: dist0 -1.9689590 -2.5222249 -1.4156931  0.2895232 98.00000 -6.800696   <0.001 ***
## 3         harm: 2F1 -0.9229161 -1.4761820 -0.3696502  0.2895232 98.00000 -3.187711    0.002  **
## 4         harm: 3F1 -1.0123090 -1.5655749 -0.4590431  0.2895232 98.00000 -3.496470    0.001 ***
## 5         harm: 4F1 -1.4009617 -1.9542276 -0.8476958  0.2895232 98.00000 -4.838859   <0.001 ***
## 6 conddist0:harm2F1  0.9367639  0.1543277  1.7192000  0.4094476 98.00000  2.287872    0.024   *
## 7 conddist0:harm3F1  0.9956543  0.2132182  1.7780904  0.4094476 98.00000  2.431701    0.017   *
## 8 conddist0:harm4F1  1.3917753  0.6093392  2.1742115  0.4094476 98.00000  3.399154    0.001 ***
##
## ESTIMATED MARGINAL MEANS, SIMPLE MAIN EFFECTS OF CONDITION WITHOUT CORRECTION
##          contrast harm  estimate        SE df  t.ratio      p.value
## 1 1 dist3 - dist0  1F1 1.9689590 0.2895232 98 6.800696 8.259162e-10
## 2 2 dist3 - dist0  2F1 1.0321952 0.2895232 98 3.565156 5.640967e-04
## 3 3 dist3 - dist0  3F1 0.9733047 0.2895232 98 3.361751 1.105525e-03
## 4 4 dist3 - dist0  4F1 0.5771837 0.2895232 98 1.993567 4.897894e-02
##
## TEST OF WHETHER OR NOT THE INTERACTION PROVIDES A BETTER FIT
## Data: cur_data
## Models:
## m2: data ~ cond + harm + (1 | subject)
## m1: data ~ cond * harm + (1 | subject)
##    Df    AIC    BIC  logLik deviance  Chisq Chi Df Pr(>Chisq)
## m2  7 324.79 344.31 -155.40   310.79
## m1 10 318.24 346.11 -149.12   298.24 12.554      3   0.005706 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

RLS_CARRIER_RC2_FREQ3




```
## LOVELY: NONE OF THE MODELS ARE SINGULAR!
##
## ANOVA TEST FOR MAIN EFFECTS AND INTERACTIONS
## Type III Analysis of Variance Table with Satterthwaite's method
##           Sum Sq Mean Sq NumDF DenDF F value   Pr(>F)
## cond      0.0189  0.0189     1    98  0.0268 0.870284
## harm      9.8132  3.2711     3    98  4.6494 0.004412 **
## cond:harm 0.5880  0.1960     3    98  0.2786 0.840723
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## SUMMARY AND POST-HOC TESTS, harm1 baseline
##                        Estimate CI (lower) CI (upper) Std. Error       df    t value Pr(>|t|)
## 1       (Intercept)  1.2695470  0.8250578  1.7140363  0.2326175 99.62549  5.4576582   <0.001 ***
## 2       cond: dist0 -0.2533755 -0.8386579  0.3319070  0.3062774 98.00000 -0.8272744     0.41
## 3         harm: 2F2 -0.7561837 -1.3414662 -0.1709012  0.3062774 98.00000 -2.4689505    0.015   *
## 4         harm: 3F2 -0.7522758 -1.3375582 -0.1669933  0.3062774 98.00000 -2.4561909    0.016   *
## 5         harm: 4F2 -0.8758785 -1.4611610 -0.2905960  0.3062774 98.00000 -2.8597557    0.005  **
## 6 conddist0:harm2F2  0.2694409 -0.5582735  1.0971553  0.4331416 98.00000  0.6220618    0.535
## 7 conddist0:harm3F2  0.3813538 -0.4463606  1.2090682  0.4331416 98.00000  0.8804367    0.381
## 8 conddist0:harm4F2  0.2624157 -0.5652987  1.0901301  0.4331416 98.00000  0.6058427    0.546
##
## ESTIMATED MARGINAL MEANS, SIMPLE MAIN EFFECTS OF CONDITION WITHOUT CORRECTION
##          contrast harm     estimate        SE df     t.ratio   p.value
## 1 1 dist3 - dist0  1F2  0.253375456 0.3062774 98  0.82727442 0.4100914
## 2 2 dist3 - dist0  2F2 -0.016065431 0.3062774 98 -0.05245386 0.9582738
## 3 3 dist3 - dist0  3F2 -0.127978346 0.3062774 98 -0.41785110 0.6769701
## 4 4 dist3 - dist0  4F2 -0.009040233 0.3062774 98 -0.02951649 0.9765127
##
## TEST OF WHETHER OR NOT THE INTERACTION PROVIDES A BETTER FIT
## Data: cur_data
## Models:
## m2: data ~ cond + harm + (1 | subject)
## m1: data ~ cond * harm + (1 | subject)
##    Df    AIC    BIC  logLik deviance  Chisq Chi Df Pr(>Chisq)
## m2  7 316.99 336.50 -151.50   302.99
## m1 10 322.10 349.97 -151.05   302.10 0.8917      3     0.8274
```