

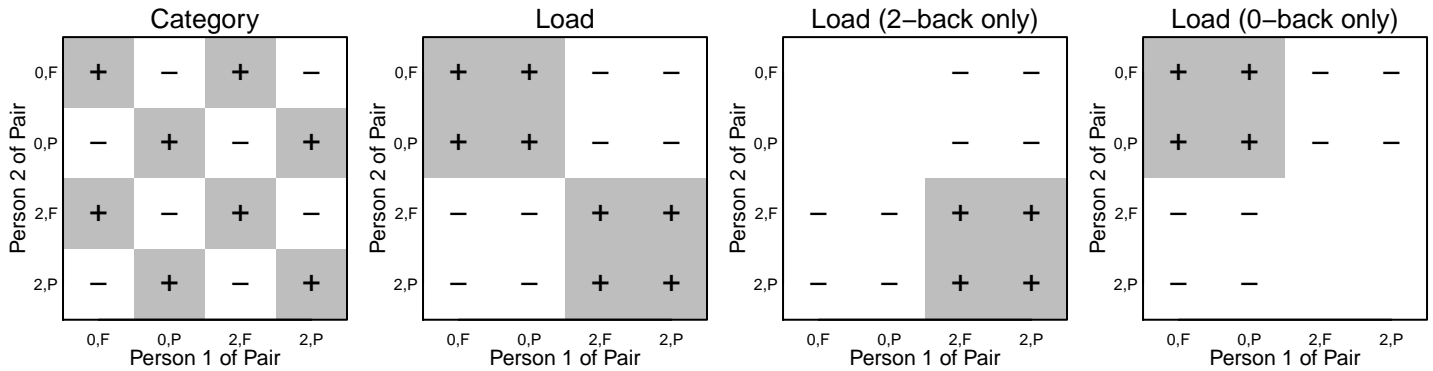
Results Supplement 4

source and input files available at <https://osf.io/p6msu/>
compiled September 6, 2019

Results Supplement 4 for “Pattern similarity analyses of frontoparietal task coding: Individual variation and genetic influences” by Joset A. Etzel, Ya’el Courtney, Caitlin E. Carey, Maria Z. Gehred, Arpana Agrawal, and Todd S. Braver.

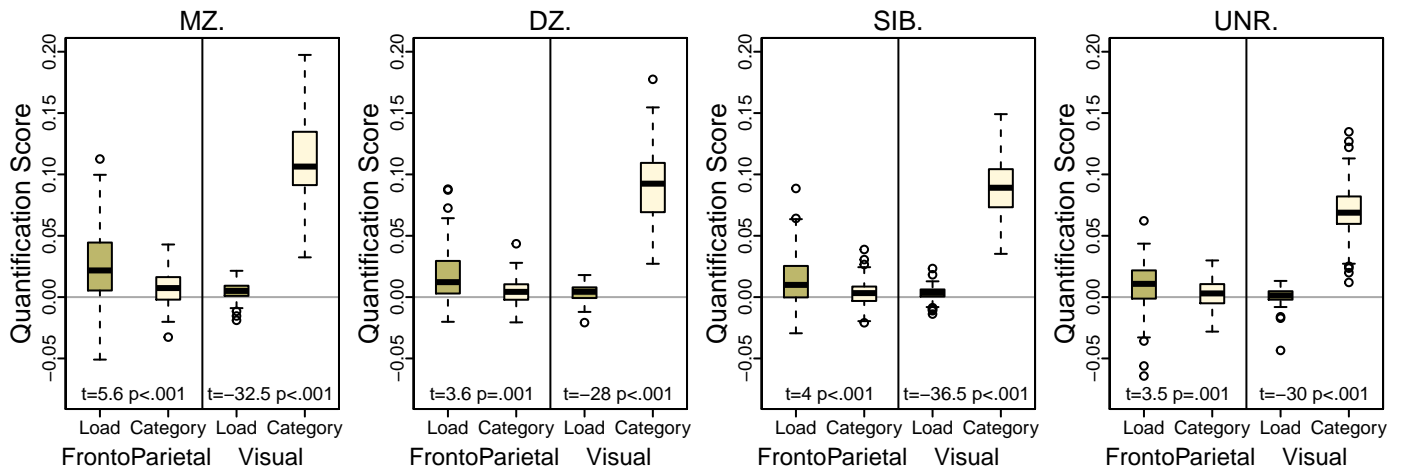
This is a knitr file (<https://yihui.name/knitr/>); see the .rnw file with the same name as this .pdf for the R code to generate all figures and results. To compile, change the in.path variable to the location of the input directory downloaded from <https://osf.io/p6msu/>.

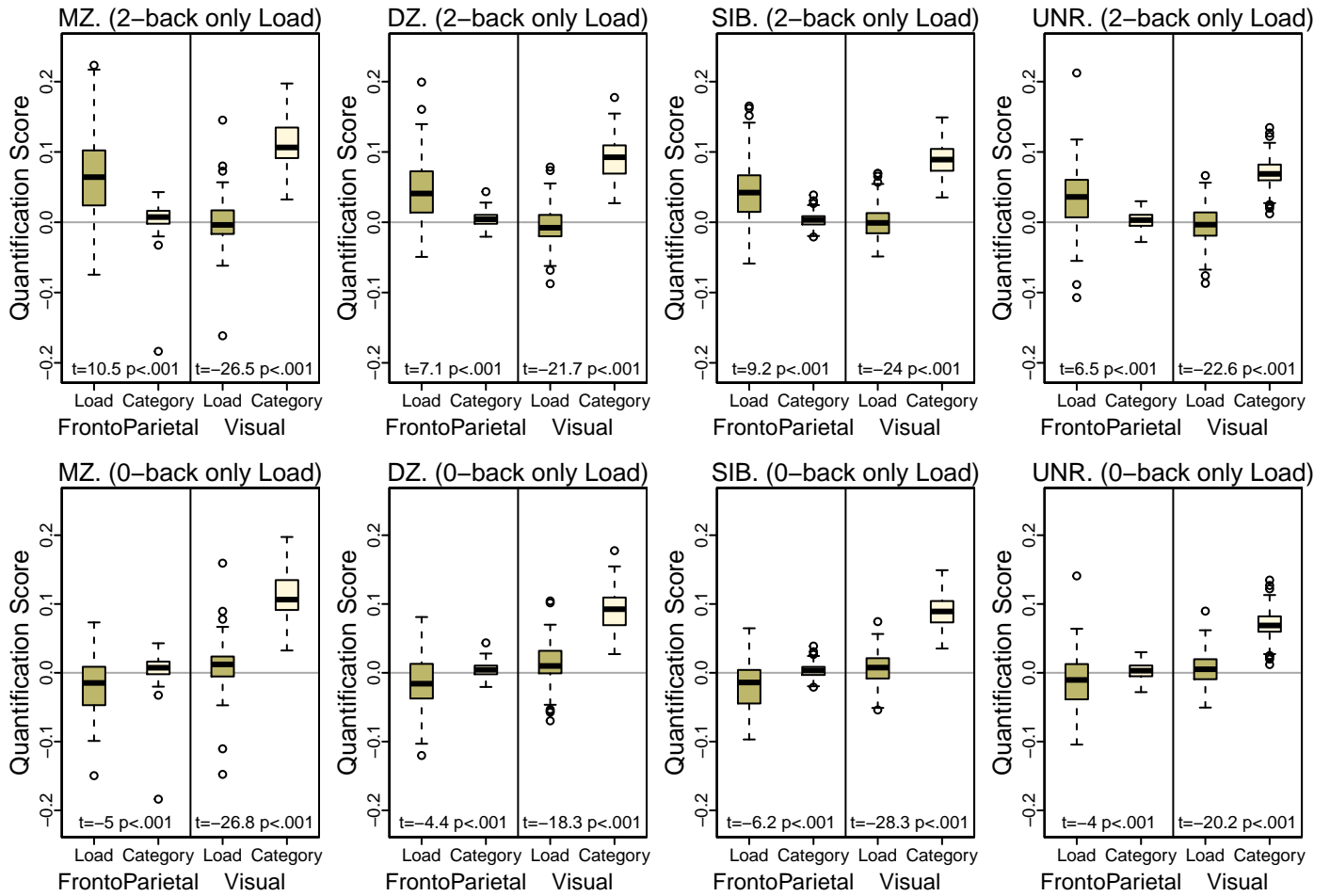
The four pairwise reference matrices; see Figure 2 on the main paper. The average of the white cells (-) is subtracted from the average of the grey cells (+) for quantification, and blank cells are not included.



S4.1a Pairwise quantification scores: Load and Category comparisons

Pairwise quantification scores, by subject group, and with different ways of quantifying Load. One MZ FrontoParietal Category outlier at -0.18 not shown for the 0 and 2-back Load quantification. Numbers printed on boxplots are for a paired robust t-test for Load \neq Category within each community and subject group. Note that y-axis scaling varies between the first row of plots and the others.





Robust t-tests for the mean of each set of quantification scores $\neq 0$. p-values uncorrected for multiple comparisons.

Category

	FrontoParietal	Visual
MZ	5.44 (<.001)	33.33 (<.001)
DZ	4.28 (<.001)	28.16 (<.001)
SIB	3.44 (.001)	36.59 (<.001)
UNR	2.28 (.025)	30.92 (<.001)

Load

	FrontoParietal	Visual
MZ	8.27 (<.001)	7.96 (<.001)
DZ	5.95 (<.001)	5.32 (<.001)
SIB	5.83 (<.001)	6.59 (<.001)
UNR	5.45 (<.001)	2.46 (.016)

Load (2-back only)

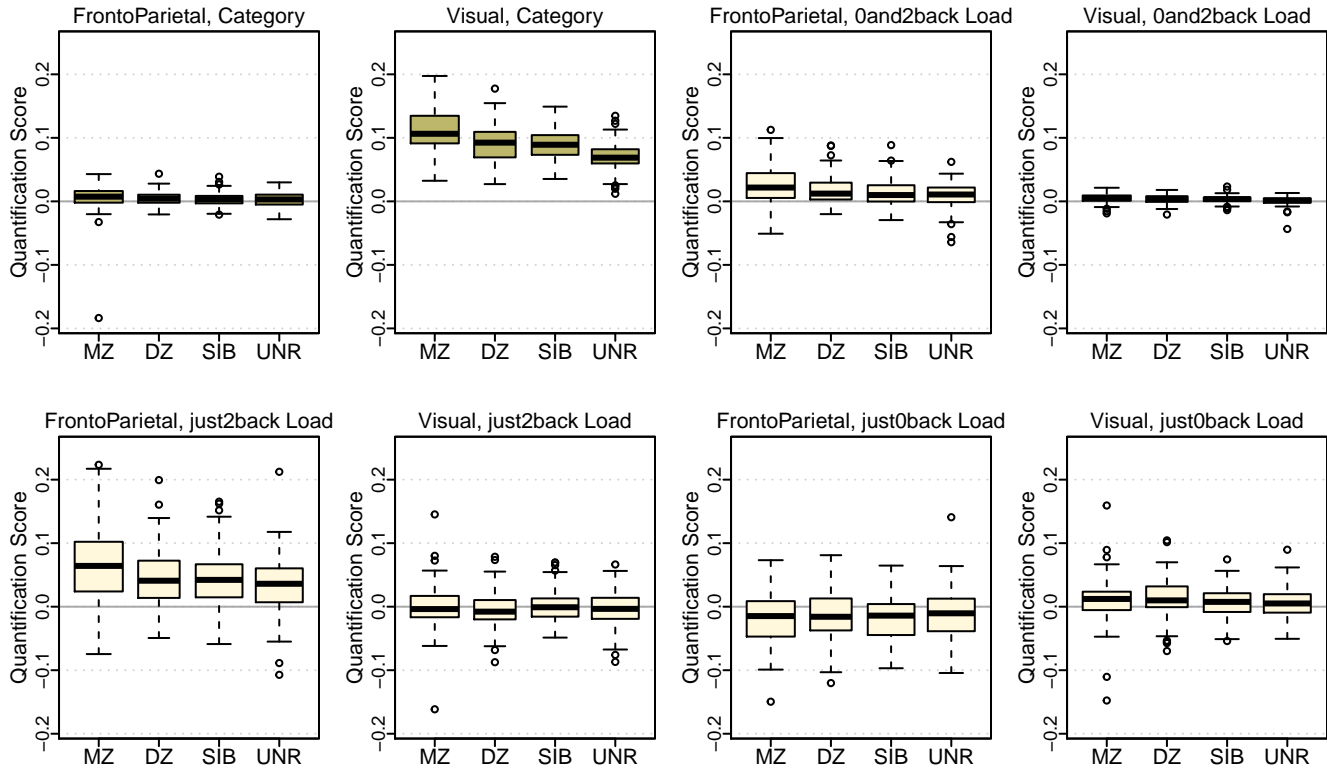
	FrontoParietal	Visual
MZ	11.37 (<.001)	-.59 (.557)
DZ	8.07 (<.001)	-1.59 (.116)
SIB	9.84 (<.001)	-.33 (.739)
UNR	7.21 (<.001)	-1.79 (.077)

Load (0-back only)

	FrontoParietal	Visual
MZ	-3.93 (<.001)	4.67 (<.001)
DZ	-3.11 (.003)	3.52 (.001)
SIB	-5.3 (<.001)	2.58 (.012)
UNR	-3.36 (.001)	2.28 (.026)

S4.1b Pairwise quantification scores: group comparisons

These are rearranged versions of the boxplots shown in S4.1a to make the group comparisons more visually obvious. The group comparisons are then tested with robust ANOVAs; posthoc tests only shown when model $p < 0.05$.



Category

```
## [1] "FrontoParietal Category"
## [1] "F=2.16881981125095 p=0.0936335405979094"
## [1]
## [1] #####
## [1] "Visual Category"
## [1] "F=35.5383277984975 p=0"
## [1] "Note: confidence intervals are adjusted to control FWE"
## [1] "But p-values are not adjusted to control FWE"
## [1] "Adjusted p-values can be computed with the R function p.adjusted"
##      Group Group      psihat      ci.lower      ci.upper      p.value
## [1,]      1      2 0.020244882 0.008049413 0.03244035 2.168774e-05
## [2,]      1      3 0.021348768 0.010536977 0.03216056 5.873670e-07
## [3,]      1      4 0.040418080 0.029802641 0.05103352 0.000000e+00
## [4,]      2      3 0.001103886 -0.009523404 0.01173118 7.832438e-01
## [5,]      2      4 0.020173198 0.009744191 0.03060220 1.105136e-06
## [6,]      3      4 0.019069312 0.010359041 0.02777958 3.853551e-08
## [1]
## [1] #####
```

the different Loads

```
## [1] "FrontoParietal 0and2back"
## [1] "F=5.57966764185612 p=0.00113705042377377"
## [1] "Note: confidence intervals are adjusted to control FWE"
## [1] "But p-values are not adjusted to control FWE"
```

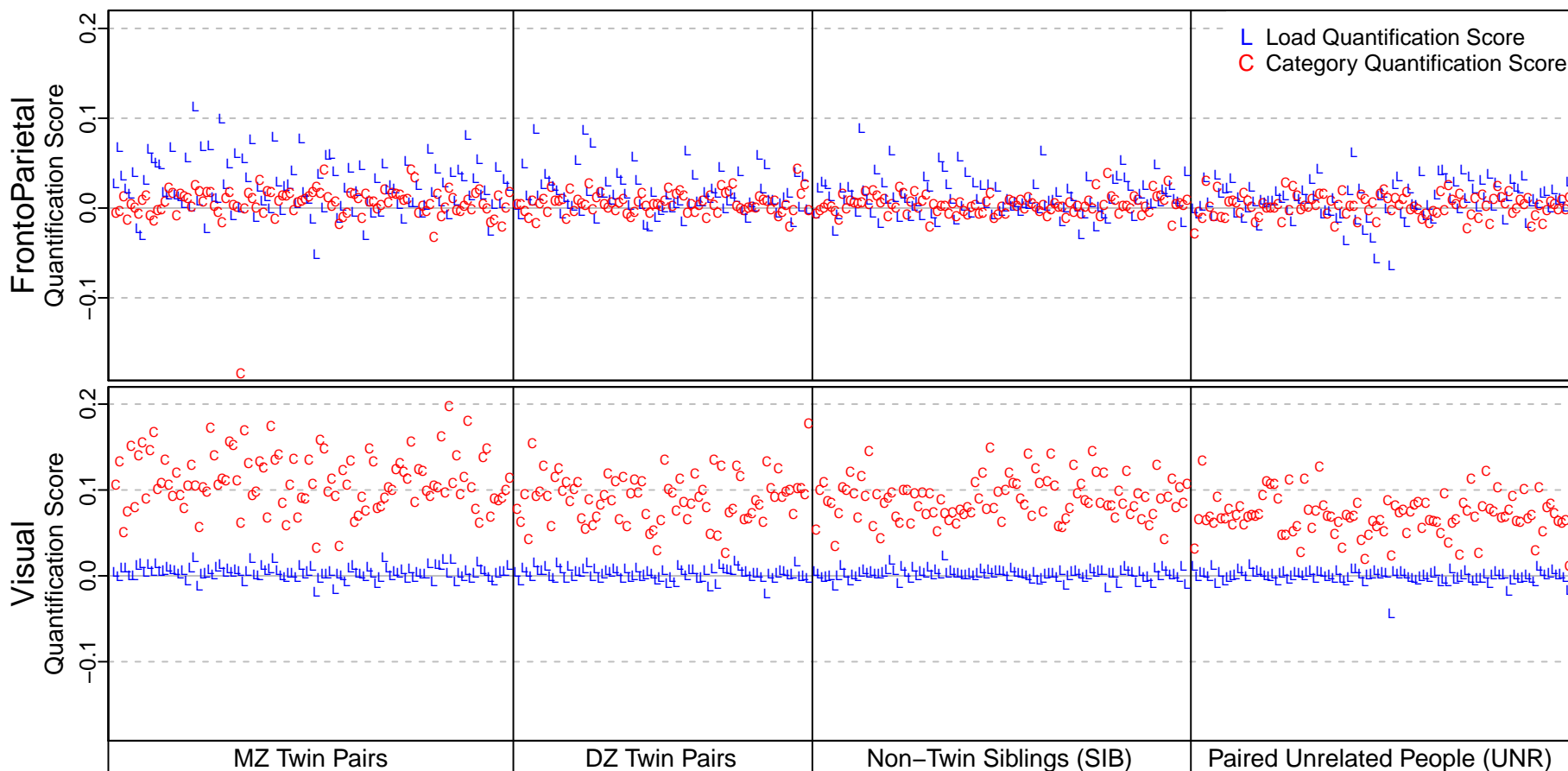
```

## [1] "Adjusted p-values can be computed with the R function p.adjusted"
##      Group Group      psihat      ci.lower      ci.upper      p.value
## [1,]      1      2 0.009401316 -0.0006962906 0.019498922 0.0149882339
## [2,]      1      3 0.012546945  0.0031806705 0.021913219 0.0005328541
## [3,]      1      4 0.013701102  0.0044202311 0.022981974 0.0001443833
## [4,]      2      3 0.003145629 -0.0052788188 0.011570077 0.3240880941
## [5,]      2      4 0.004299787 -0.0040291643 0.012628738 0.1733552928
## [6,]      3      4 0.001154158 -0.0062321009 0.008540416 0.6805176437
## [1]
## [1] #####
## [1] "Visual Oand2back"
## [1] "F=8.42917907166781 p=3.03719760563759e-05"
## [1] "Note: confidence intervals are adjusted to control FWE"
## [1] "But p-values are not adjusted to control FWE"
## [1] "Adjusted p-values can be computed with the R function p.adjusted"
##      Group Group      psihat      ci.lower      ci.upper      p.value
## [1,]      1      2 0.0014080108 -0.0011144848 0.003930506 1.418828e-01
## [2,]      1      3 0.0018294730 -0.0003553603 0.004014306 2.847470e-02
## [3,]      1      4 0.0039556757  0.0017891998 0.006122152 3.360263e-06
## [4,]      2      3 0.0004214622 -0.0018720149 0.002714939 6.265043e-01
## [5,]      2      4 0.0025476649  0.0002713924 0.004823937 3.571192e-03
## [6,]      3      4 0.0021262027  0.0002401516 0.004012254 3.375880e-03
## [1]
## [1] #####
## [1] "FrontoParietal just2back"
## [1] "F=7.05914651339201 p=0.000170763385635597"
## [1] "Note: confidence intervals are adjusted to control FWE"
## [1] "But p-values are not adjusted to control FWE"
## [1] "Adjusted p-values can be computed with the R function p.adjusted"
##      Group Group      psihat      ci.lower      ci.upper      p.value
## [1,]      1      2 0.020490679 -0.0006413892 0.04162275 1.135125e-02
## [2,]      1      3 0.022637263  0.0036927702 0.04158176 1.922028e-03
## [3,]      1      4 0.033046359  0.0140932503 0.05199947 8.534107e-06
## [4,]      2      3 0.002146584 -0.0167443839 0.02103755 7.635953e-01
## [5,]      2      4 0.012555679 -0.0063438898 0.03145525 8.044620e-02
## [6,]      3      4 0.010409096 -0.0059451508 0.02676334 9.486937e-02
## [1]
## [1] #####
## [1] "Visual just2back"
## [1] "F=0.594291250911763 p=0.619589657166908"
## [1]
## [1] #####
## [1] "FrontoParietal just0back"
## [1] "F=0.700493309996906 p=0.553013019603139"
## [1]
## [1] #####
## [1] "Visual just0back"
## [1] "F=1.45667977762608 p=0.228367100591394"
## [1]
## [1] #####

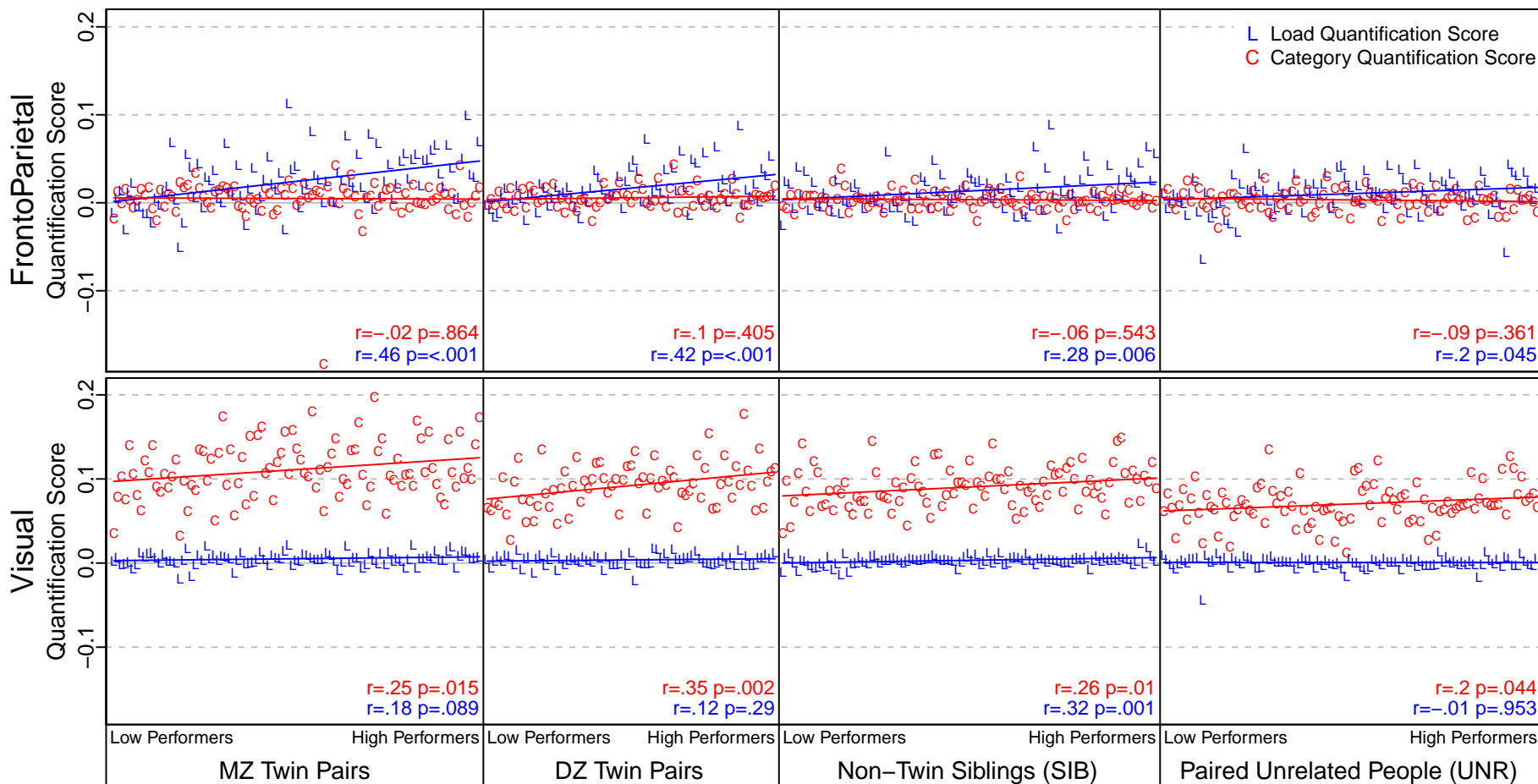
```

S4.2 Pairwise quantification scores: full dataset

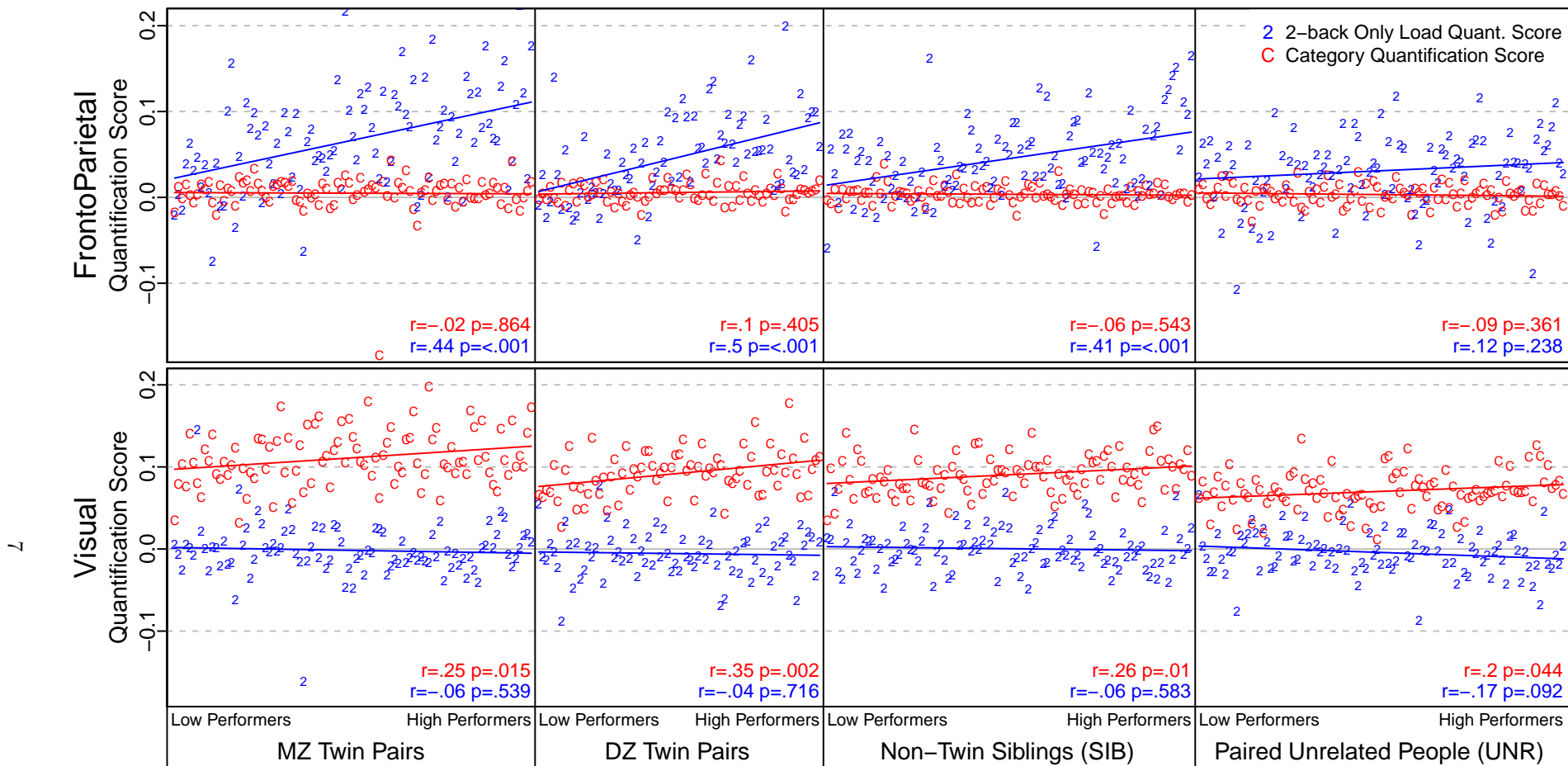
Quantification of each set of paired participants' similarity matrix to the Load (blue, L, with both 0 and 2-back) and Category (red, C). The paired participants are arrayed along the x-axis **in arbitrary order within each type** (MZ, DZ, SIB, UNR), with the two quantifications for each pair of participants in each column. The participants are shown in arbitrary order here to provide a contrast for the appearance when participants are sorted by behavioral performance in the next figure. Also, several participants are missing behavioral performance data, so are included here, but omitted from the next graph.



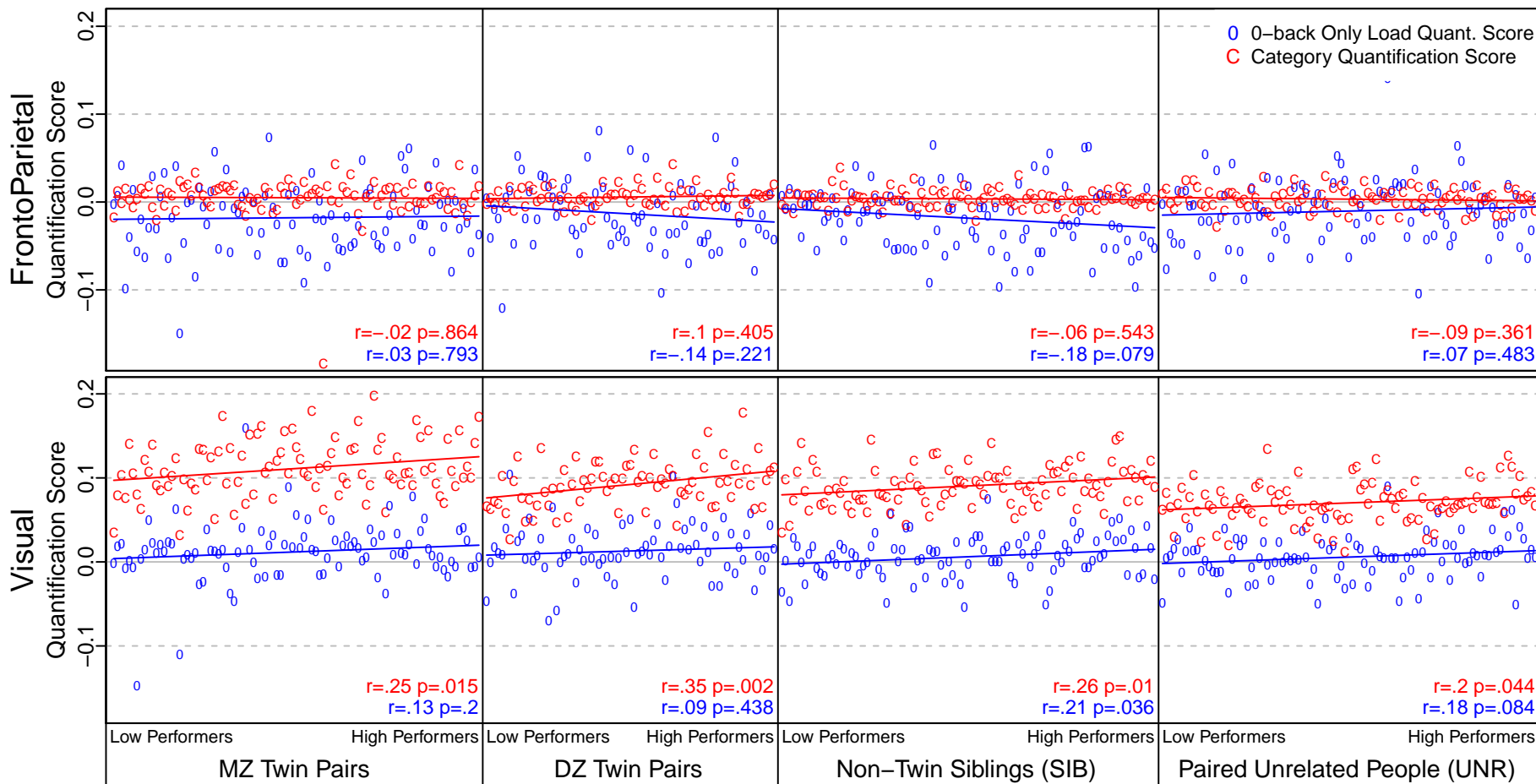
Quantification of each set of paired participants' similarity matrix to the Load (blue, L, with both 0 and 2-back) and Category (red, S) The paired participants are arrayed along the x-axis in **order of increasing mean behavioral performance** within each type (MZ, DZ, SIB, UNR), with the two quantification scores in each column. Displayed correlation and regression lines are between the quantification score and subject order (1:n), not the actual mean pairwise behavior. Figure 9 in the main manuscript.



Same, but Load quantified using **2-back only**.

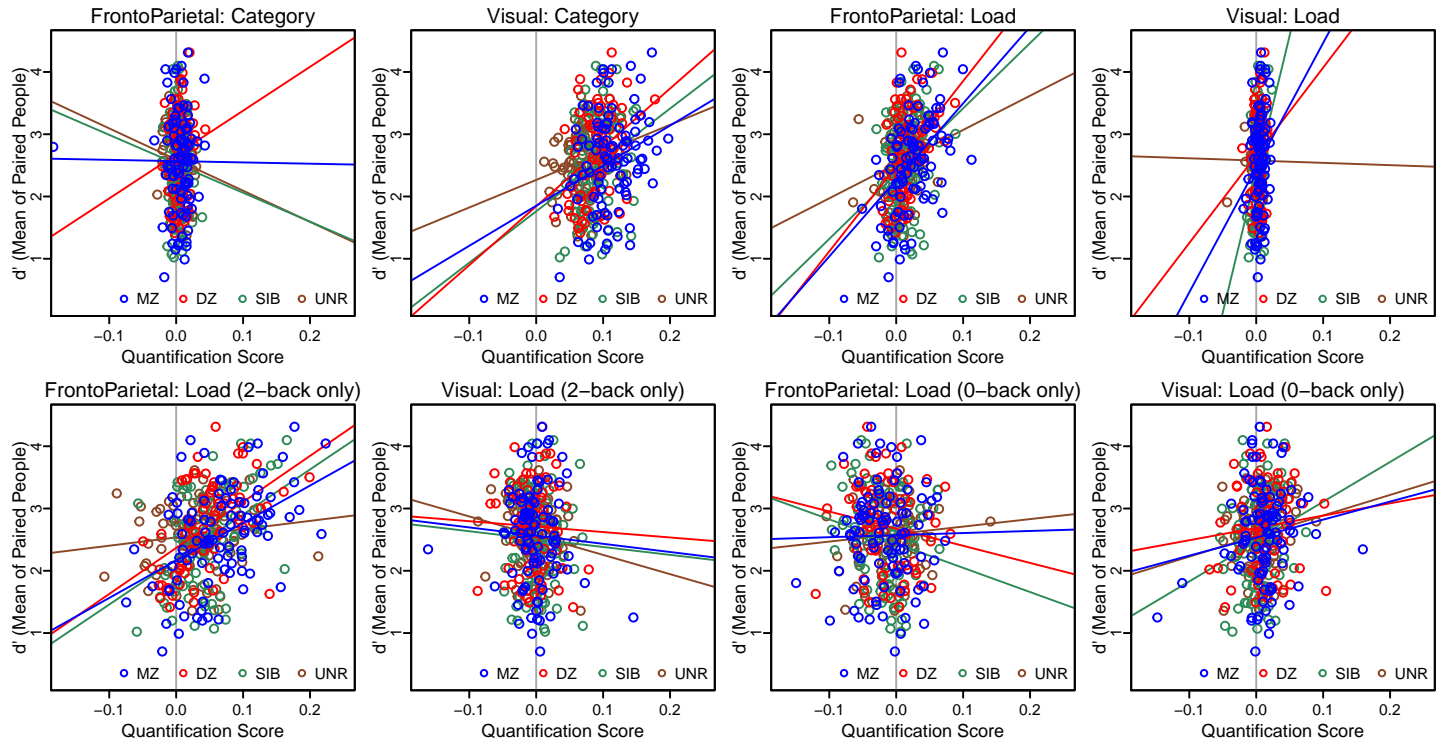


Same, but Load quantified using **0-back only**.



S4.3 Pairwise quantification scores: correlation with behavior

The correlation between the average of pair's behavioral performance (d') and the pairwise quantification as specified by the Load and Category references. The correlations are listed below the graphs; p-values for each in parentheses, from `hc4wtest`, and uncorrected for multiple comparisons. Tests for pairwise correlation differences follow.



	MZ	DZ	SIB	UNR
FrontoParietal, Category	-.01 (.904)	.11 (.24)	-.06 (.536)	-.12 (.25)
Visual, Category	.27 (.002)	.36 (.004)	.26 (.024)	.2 (.022)
FrontoParietal, Load	.47 (<.001)	.41 (<.001)	.29 (.002)	.22 (.1)
Visual, Load	.19 (.038)	.14 (.18)	.34 (.004)	0 (.968)
FrontoParietal, Load (2-back only)	.46 (<.001)	.49 (<.001)	.43 (<.001)	.12 (.274)
Visual, Load (2-back only)	-.05 (.696)	-.03 (.792)	-.04 (.706)	-.16 (.176)
FrontoParietal, Load (0-back only)	.02 (.856)	-.15 (.264)	-.18 (.082)	.09 (.35)
Visual, Load (0-back only)	.13 (.248)	.09 (.49)	.21 (.04)	.16 (.086)

FrontoParietal, Category

	MZ	DZ	SIB	UNR
MZ				
DZ	.639			
SIB	.827	.212		
UNR	.665	.105	.694	

Visual, Category

	MZ	DZ	SIB	UNR
MZ				
DZ	.546			
SIB	.932	.513		
UNR	.585	.248	.672	

FrontoParietal, Load

	MZ	DZ	SIB	UNR
MZ				
DZ	.69			
SIB	.234	.38		
UNR	.111	.185	.625	

Visual, Load

	MZ	DZ	SIB	UNR
MZ				
DZ	.691			
SIB	.279	.172		
UNR	.509	.646	.253	

FrontoParietal, Load (2-back only)

	MZ	DZ	SIB	UNR
MZ				
DZ	.798			
SIB	.838	.663		
UNR	.03	.021	.06	

Visual, Load (2-back only)

	MZ	DZ	SIB	UNR
MZ				
DZ	.922			
SIB	.952	.962		
UNR	.588	.511	.491	

FrontoParietal, Load (0-back only)

	MZ	DZ	SIB	UNR
MZ				
DZ	.344			
SIB	.177	.83		
UNR	.627	.161	.054	

Visual, Load (0-back only)

	MZ	DZ	SIB	UNR
MZ				
DZ	.814			
SIB	.637	.486		
UNR	.849	.666	.759	

S4.4 Pairwise quantification scores: multiple regression

These models have pairwise quantification score as the outcome variable, predicted by the d' of person 1 of each pair (`dprime.1`), d' of person 2 of the pair (`dprime.2`), single-subject quantification score of person 1 (`q.1`), or single-subject quantification score of person 2 (`q.2`).

Load, FrontoParietal, MZ twins.

```
mreg.tbl <- get.tbl("MZ", "load", "FrontoParietal", "0and2back"); # Load quantified with 0 & 2-back trials
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full); # full model F very similar to with just 2-back; dprime.2 and q.1 less sig. here

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##     mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.068588 -0.012813 -0.000652  0.015723  0.060887
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -0.027616   0.008574  -3.221 0.001778 **
## mreg.tbl$dprime.1  0.010166   0.002834   3.587 0.000543 ***
## mreg.tbl$dprime.2  0.004726   0.003190   1.482 0.141929
## mreg.tbl$q.1      0.030631   0.020515   1.493 0.138900
## mreg.tbl$q.2      0.080003   0.016440   4.866 4.82e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02354 on 90 degrees of freedom
## Multiple R-squared:  0.3909, Adjusted R-squared:  0.3639
## F-statistic: 14.44 on 4 and 90 DF,  p-value: 3.792e-09

beta.coef(lm.full); # standardized b values (betas)

##
## Beta Coefficients for: lm.full
##
##              mreg.tbl$dprime.1 mreg.tbl$dprime.2 mreg.tbl$q.1 mreg.tbl$q.2
## Beta.Coeff      0.3312026          0.1395412      0.1241241      0.4129321

lm.d12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2);
summary(lm.d12); # just d primes significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.061538 -0.016137 -0.004076  0.014375  0.087746
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -0.021146   0.009426  -2.243 0.02727 *
## mreg.tbl$dprime.1  0.009067   0.003138   2.889 0.00481 **
## mreg.tbl$dprime.2  0.008679   0.003463   2.507 0.01395 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02637 on 92 degrees of freedom
```

```

## Multiple R-squared:  0.2185, Adjusted R-squared:  0.2015
## F-statistic: 12.86 on 2 and 92 DF,  p-value: 1.189e-05

anova(lm.full, lm.d12); # full better than just d primes

## Analysis of Variance Table
##
## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##   mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2
##   Res.Df      RSS Df Sum of Sq    F    Pr(>F)
## 1      90 0.049859
## 2      92 0.063977 -2 -0.014118 12.742 1.341e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

lm.q12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.q12); # just qs significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.089106 -0.016769 -0.000484  0.020640  0.057546
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.008380   0.004426   1.893  0.0615 .
## mreg.tbl$q.1  0.045059   0.022640   1.990  0.0495 *
## mreg.tbl$q.2  0.085794   0.017775   4.827  5.5e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02624 on 92 degrees of freedom
## Multiple R-squared:  0.226, Adjusted R-squared:  0.2092
## F-statistic: 13.43 on 2 and 92 DF,  p-value: 7.62e-06

anova(lm.full, lm.q12); # full better than just single-subject q scores

## Analysis of Variance Table
##
## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##   mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2
##   Res.Df      RSS Df Sum of Sq    F    Pr(>F)
## 1      90 0.049859
## 2      92 0.063361 -2 -0.013503 12.187 2.072e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

#####
mreg.tbl <- get.tbl("MZ", "load", "FrontoParietal", "just2back"); # Load quantified with 2-back trials only
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full); # full model F very similar to with just 2-back; dprime.2 and q.1 less sig. here

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##   mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:

```

```

##           Min           1Q       Median           3Q           Max
## -0.141419 -0.029691 -0.000669  0.031728  0.106107
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -0.039659  0.017083  -2.321  0.02252 *
## mreg.tbl$dprime.1  0.016461  0.005646   2.915  0.00448 **
## mreg.tbl$dprime.2  0.011803  0.006356   1.857  0.06657 .
## mreg.tbl$q.1       0.169000  0.040876   4.134 7.97e-05 ***
## mreg.tbl$q.2       0.109508  0.032758   3.343  0.00121 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.0469 on 90 degrees of freedom
## Multiple R-squared:  0.3936, Adjusted R-squared:  0.3666
## F-statistic: 14.6 on 4 and 90 DF,  p-value: 3.141e-09

beta.coef(lm.full); # standardized b values (betas)

##
## Beta Coefficients for: lm.full
##
##           mreg.tbl$dprime.1 mreg.tbl$dprime.2 mreg.tbl$q.1 mreg.tbl$q.2
## Beta.Coeff           0.2685728           0.1745203           0.3429532           0.2830544

lm.d12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2);
summary(lm.d12); # just d primes significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2)
##
## Residuals:
##           Min           1Q       Median           3Q           Max
## -0.121128 -0.032995  0.001587  0.033042  0.149606
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -0.022462  0.018939  -1.186  0.23868
## mreg.tbl$dprime.1  0.016808  0.006306   2.666  0.00908 **
## mreg.tbl$dprime.2  0.017952  0.006958   2.580  0.01146 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.05299 on 92 degrees of freedom
## Multiple R-squared:  0.2087, Adjusted R-squared:  0.1915
## F-statistic: 12.13 on 2 and 92 DF,  p-value: 2.108e-05

anova(lm.full, lm.d12); # full better than just d primes

## Analysis of Variance Table
##
## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##           mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2
##   Res.Df    RSS Df Sum of Sq    F    Pr(>F)
## 1      90 0.19795
## 2      92 0.25830 -2 -0.060349 13.719 6.303e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

lm.q12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.q12); # just qs significant

```

```

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.175226 -0.029765  0.002218  0.032149  0.117628
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.028126   0.008674   3.243 0.001651 **
## mreg.tbl$q.1 0.195316   0.044366   4.402 2.88e-05 ***
## mreg.tbl$q.2 0.124091   0.034832   3.563 0.000584 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.05143 on 92 degrees of freedom
## Multiple R-squared:  0.2546, Adjusted R-squared:  0.2384
## F-statistic: 15.71 on 2 and 92 DF,  p-value: 1.349e-06

anova(lm.full, lm.q12); # full better than just single-subject q scores

## Analysis of Variance Table
##
## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##      mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2
##   Res.Df    RSS Df Sum of Sq    F    Pr(>F)
## 1      90 0.19795
## 2      92 0.24332 -2 -0.045366 10.313 9.275e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

#####
mreg.tbl <- get.tbl("MZ", "load", "FrontoParietal", "justOback"); # Load quantified with 0-back trials only
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full); # full model with just 0-back Load quantification less significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##      mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.08189 -0.02440 -0.00038  0.02447  0.08257
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.015573   0.013620  -1.143  0.25590
## mreg.tbl$dprime.1  0.003870   0.004501   0.860  0.39216
## mreg.tbl$dprime.2 -0.002351   0.005067  -0.464  0.64381
## mreg.tbl$q.1     -0.107738   0.032589  -3.306  0.00136 **
## mreg.tbl$q.2      0.050498   0.026117   1.934  0.05631 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03739 on 90 degrees of freedom
## Multiple R-squared:  0.1442, Adjusted R-squared:  0.1062
## F-statistic: 3.792 on 4 and 90 DF,  p-value: 0.00677

beta.coef(lm.full);

```

```

##
## Beta Coefficients for: lm.full
##
##           mreg.tbl$dprime.1 mreg.tbl$dprime.2 mreg.tbl$q.1 mreg.tbl$q.2
## Beta.Coef           0.09409575           -0.05179298           -0.3257701           0.1944882

lm.d12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2);
summary(lm.d12); # not significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.129896 -0.029681 -0.000412  0.025657  0.090897
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -0.0198302  0.0142830  -1.388   0.168
## mreg.tbl$dprime.1  0.0013259  0.0047553   0.279   0.781
## mreg.tbl$dprime.2 -0.0005931  0.0052471  -0.113   0.910
##
## Residual standard error: 0.03996 on 92 degrees of freedom
## Multiple R-squared:  0.0008452, Adjusted R-squared:  -0.02088
## F-statistic: 0.03891 on 2 and 92 DF,  p-value: 0.9619

lm.q12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.q12); # just qs significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.084593 -0.025312 -0.000083  0.025359  0.083656
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.011366   0.006263  -1.815  0.07284 .
## mreg.tbl$q.1 -0.105197   0.032036  -3.284  0.00145 **
## mreg.tbl$q.2  0.047497   0.025152   1.888  0.06212 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03713 on 92 degrees of freedom
## Multiple R-squared:  0.1371, Adjusted R-squared:  0.1183
## F-statistic: 7.309 on 2 and 92 DF,  p-value: 0.001132

anova(lm.full, lm.q12); # full NOT better than just single-subject q scores

## Analysis of Variance Table
##
## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
## mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2
##  Res.Df    RSS Df Sum of Sq    F Pr(>F)
## 1      90 0.12582
## 2      92 0.12687 -2 -0.001047 0.3744 0.6887

```

Load, FrontoParietal, DZ twins.

```
mreg.tbl <- get.tbl("DZ", "load", "FrontoParietal", "0and2back"); # Load quantified with 0 & 2-back trials
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full); # q scores more significant than d' (opposite of when just 2-back Load quantification)

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##     mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.038235 -0.012119 -0.000609  0.011419  0.051619
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -0.015051  0.008881  -1.695  0.0946 .
## mreg.tbl$dprime.1  0.003423  0.002424   1.412  0.1624
## mreg.tbl$dprime.2  0.004844  0.002968   1.632  0.1071
## mreg.tbl$q.1     0.040562  0.019777   2.051  0.0440 *
## mreg.tbl$q.2     0.041779  0.015353   2.721  0.0082 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01868 on 70 degrees of freedom
## Multiple R-squared:  0.2922, Adjusted R-squared:  0.2517
## F-statistic: 7.223 on 4 and 70 DF,  p-value: 6.277e-05

beta.coef(lm.full); # standardized b values (betas)

##
## Beta Coefficients for: lm.full
##
##           mreg.tbl$dprime.1 mreg.tbl$dprime.2 mreg.tbl$q.1 mreg.tbl$q.2
## Beta.Coeff      0.1589232      0.1787022      0.2250948      0.2901622

lm.d12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2);
summary(lm.d12); # model significant, both people's d's significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.036403 -0.013121 -0.000647  0.010917  0.060411
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -0.018501  0.009377  -1.973  0.0523 .
## mreg.tbl$dprime.1  0.005440  0.002379   2.287  0.0252 *
## mreg.tbl$dprime.2  0.007496  0.002994   2.504  0.0146 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01989 on 72 degrees of freedom
## Multiple R-squared:  0.1745, Adjusted R-squared:  0.1515
## F-statistic: 7.608 on 2 and 72 DF,  p-value: 0.001006

anova(lm.full, lm.d12); # full better than just d primes

## Analysis of Variance Table
##
```



```

## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##   mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2
##   Res.Df      RSS Df Sum of Sq      F Pr(>F)
## 1      70 0.024421
## 2      72 0.028481 -2 -0.0040608 5.8199 0.00459 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

lm.q12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.q12) # model significant, both people's qs significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.042261 -0.011995  0.000189  0.013225  0.055160
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.004624   0.003485   1.327 0.188696
## mreg.tbl$q.1  0.054960   0.018617   2.952 0.004258 **
## mreg.tbl$q.2  0.051995   0.014875   3.495 0.000814 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01917 on 72 degrees of freedom
## Multiple R-squared:  0.233, Adjusted R-squared:  0.2117
## F-statistic: 10.93 on 2 and 72 DF,  p-value: 7.133e-05

anova(lm.full, lm.q12); # full marginally better than just single-subject q scores

## Analysis of Variance Table
##
## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##   mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2
##   Res.Df      RSS Df Sum of Sq      F Pr(>F)
## 1      70 0.024421
## 2      72 0.026463 -2 -0.0020424 2.9272 0.06013 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

#####
mreg.tbl <- get.tbl("DZ", "load", "FrontoParietal", "just2back"); # Load quantified with 2-back trials only
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full); # q scores more significant than d' (opposite of when just 2-back Load quantification)

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##   mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.085879 -0.026186 -0.008619  0.022745  0.118928
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.042705   0.019617  -2.177 0.03285 *
## mreg.tbl$dprime.1  0.010324   0.005355   1.928 0.05792 .

```

```

## mreg.tbl$dprime.2 0.017956 0.006556 2.739 0.00781 **
## mreg.tbl$q.1 0.071261 0.043685 1.631 0.10733
## mreg.tbl$q.2 0.037427 0.033913 1.104 0.27353
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.04126 on 70 degrees of freedom
## Multiple R-squared: 0.2889, Adjusted R-squared: 0.2483
## F-statistic: 7.111 on 4 and 70 DF, p-value: 7.284e-05

beta.coef(lm.full); # standardized b values (betas)

##
## Beta Coefficients for: lm.full
##
## mreg.tbl$dprime.1 mreg.tbl$dprime.2 mreg.tbl$q.1 mreg.tbl$q.2
## Beta.Coeff 0.2174759 0.3005738 0.1794359 0.1179456

lm.d12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2);
summary(lm.d12); # model significant, both people's d's significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2)
##
## Residuals:
## Min 1Q Median 3Q Max
## -0.090080 -0.025317 -0.009442 0.020831 0.123691
##
## Coefficients:
## Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.046097 0.019704 -2.339 0.02209 *
## mreg.tbl$dprime.1 0.013792 0.004999 2.759 0.00735 **
## mreg.tbl$dprime.2 0.020387 0.006291 3.241 0.00181 **
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.0418 on 72 degrees of freedom
## Multiple R-squared: 0.2495, Adjusted R-squared: 0.2286
## F-statistic: 11.97 on 2 and 72 DF, p-value: 3.263e-05

anova(lm.full, lm.d12); # full better than just d primes

## Analysis of Variance Table
##
## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
## mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2
## Res.Df RSS Df Sum of Sq F Pr(>F)
## 1 70 0.11915
## 2 72 0.12577 -2 -0.0066182 1.944 0.1508

lm.q12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.q12) # model significant, both people's qs significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
## Min 1Q Median 3Q Max
## -0.08666 -0.02977 -0.00355 0.02855 0.12627
##

```

```

## Coefficients:
##           Estimate Std. Error t value Pr(>|t|)
## (Intercept) 0.024985  0.008099  3.085 0.00289 **
## mreg.tbl$q.1 0.116772  0.043270  2.699 0.00867 **
## mreg.tbl$q.2 0.074072  0.034574  2.142 0.03554 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.04456 on 72 degrees of freedom
## Multiple R-squared:  0.1469, Adjusted R-squared:  0.1232
## F-statistic: 6.199 on 2 and 72 DF,  p-value: 0.003282

anova(lm.full, lm.q12); # full marginally better than just single-subject q scores

## Analysis of Variance Table
##
## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##           mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2
##   Res.Df    RSS Df Sum of Sq    F Pr(>F)
## 1      70 0.11915
## 2      72 0.14296 -2 -0.023805 6.9924 0.001704 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Load, FrontoParietal, SIB.

```
mreg.tbl <- get.tbl("SIB", "load", "FrontoParietal", "0and2back"); # Load quantified with 0 & 2-back trials
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full); # overall model, q.2 sig.

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##     mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.041467 -0.013244 -0.001844  0.013288  0.064466
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -0.006947   0.007237  -0.960   0.33964
## mreg.tbl$dprime.1  0.003090   0.002331   1.326   0.18826
## mreg.tbl$dprime.2  0.003278   0.002729   1.201   0.23272
## mreg.tbl$q.1     -0.007652   0.015625  -0.490   0.62550
## mreg.tbl$q.2      0.049875   0.017022   2.930   0.00427 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01963 on 92 degrees of freedom
## Multiple R-squared:  0.1704, Adjusted R-squared:  0.1344
## F-statistic: 4.725 on 4 and 92 DF,  p-value: 0.001636

beta.coef(lm.full); # standardized b values (betas)

##
## Beta Coefficients for: lm.full
##
##           mreg.tbl$dprime.1 mreg.tbl$dprime.2 mreg.tbl$q.1 mreg.tbl$q.2
## Beta.Coeff      0.148473          0.1286318   -0.0527755    0.3013414

lm.d12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2);
summary(lm.d12); # model significant; dprime.2 more sig. than dprime.1

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.04844 -0.01290 -0.00207  0.01090  0.07121
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -0.008829   0.007457  -1.184   0.2394
## mreg.tbl$dprime.1  0.002797   0.002161   1.294   0.1988
## mreg.tbl$dprime.2  0.005954   0.002646   2.250   0.0268 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02031 on 94 degrees of freedom
## Multiple R-squared:  0.09299, Adjusted R-squared:  0.07369
## F-statistic: 4.819 on 2 and 94 DF,  p-value: 0.01018

anova(lm.full, lm.d12); # full better than just d primes

## Analysis of Variance Table
##
```

```

## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##   mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2
##   Res.Df      RSS Df  Sum of Sq      F Pr(>F)
## 1      92 0.035462
## 2      94 0.038772 -2 -0.0033099 4.2935 0.01649 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

lm.q12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.q12) # model significant; q.2 significant (not q.1)

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.037100 -0.014787 -0.000977  0.015553  0.065010
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.007016   0.002980   2.354 0.020636 *
## mreg.tbl$q.1  0.001364   0.014215   0.096 0.923765
## mreg.tbl$q.2  0.058782   0.016227   3.622 0.000473 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01992 on 94 degrees of freedom
## Multiple R-squared:  0.1275, Adjusted R-squared:  0.1089
## F-statistic: 6.866 on 2 and 94 DF, p-value: 0.001648

anova(lm.full, lm.q12); # full marginally better than just single-subject q scores

## Analysis of Variance Table
##
## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##   mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2
##   Res.Df      RSS Df  Sum of Sq      F Pr(>F)
## 1      92 0.035462
## 2      94 0.037298 -2 -0.0018366 2.3823 0.09801 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

#####
mreg.tbl <- get.tbl("SIB", "load", "FrontoParietal", "just2back"); # Load quantified with 2-back trials only
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full); # overall model, q.2 & dprime.1 sig.

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##   mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.103441 -0.027116 -0.003808  0.024853  0.110742
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.012168   0.014612  -0.833  0.40714
## mreg.tbl$dprime.1  0.015470   0.004707   3.287  0.00144 **

```

```

## mreg.tbl$dprime.2 0.004930 0.005510 0.895 0.37321
## mreg.tbl$q.1 -0.012204 0.031548 -0.387 0.69976
## mreg.tbl$q.2 0.081774 0.034367 2.379 0.01940 *
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03964 on 92 degrees of freedom
## Multiple R-squared: 0.2339, Adjusted R-squared: 0.2006
## F-statistic: 7.023 on 4 and 92 DF, p-value: 5.583e-05

beta.coef(lm.full); # standardized b values (betas)

##
## Beta Coefficients for: lm.full
##
## mreg.tbl$dprime.1 mreg.tbl$dprime.2 mreg.tbl$q.1 mreg.tbl$q.2
## Beta.Coeff 0.3537495 0.09207646 -0.04006272 0.2351523

lm.d12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2);
summary(lm.d12); # model significant; dprime.1 more sig. than dprime.2

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2)
##
## Residuals:
## Min 1Q Median 3Q Max
## -0.114865 -0.026501 -0.003329 0.025972 0.130195
##
## Coefficients:
## Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.015254 0.014835 -1.028 0.306480
## mreg.tbl$dprime.1 0.015011 0.004299 3.491 0.000734 ***
## mreg.tbl$dprime.2 0.009313 0.005264 1.769 0.080136 .
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.04041 on 94 degrees of freedom
## Multiple R-squared: 0.1868, Adjusted R-squared: 0.1695
## F-statistic: 10.79 on 2 and 94 DF, p-value: 6.026e-05

anova(lm.full, lm.d12); # full marginally better than just d primes

## Analysis of Variance Table
##
## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
## mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2
## Res.Df RSS Df Sum of Sq F Pr(>F)
## 1 92 0.14456
## 2 94 0.15346 -2 -0.0088989 2.8317 0.06406 .
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

lm.q12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.q12) # model significant; q.2 significant (not q.1)

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
## Min 1Q Median 3Q Max

```

```

## -0.09266 -0.02948 -0.00268 0.02924 0.10877
##
## Coefficients:
##           Estimate Std. Error t value Pr(>|t|)
## (Intercept) 0.030529 0.006332 4.821 5.48e-06 ***
## mreg.tbl$q.1 0.033321 0.030206 1.103 0.27279
## mreg.tbl$q.2 0.100667 0.034482 2.919 0.00439 **
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.04233 on 94 degrees of freedom
## Multiple R-squared: 0.1075, Adjusted R-squared: 0.08851
## F-statistic: 5.661 on 2 and 94 DF, p-value: 0.004771

anova(lm.full, lm.q12); # full better than just single-subject q scores

## Analysis of Variance Table
##
## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##           mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2
##   Res.Df    RSS Df Sum of Sq    F Pr(>F)
## 1      92 0.14456
## 2      94 0.16842 -2 -0.023858 7.5916 0.000888 ***
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Load, FrontoParietal, UNR.

```
mreg.tbl <- get.tbl("UNR", "load", "FrontoParietal", "0and2back"); # Load quantified with 0 & 2-back trials
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full); # full model not significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##     mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.07094 -0.01277  0.00179  0.01273  0.05505
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.012988  0.010401  -1.249  0.2149
## mreg.tbl$dprime.1  0.002211  0.002463   0.897  0.3718
## mreg.tbl$dprime.2  0.006062  0.002516   2.410  0.0179 *
## mreg.tbl$q.1      0.020475  0.015773   1.298  0.1975
## mreg.tbl$q.2     -0.006579  0.015459  -0.426  0.6714
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01998 on 92 degrees of freedom
## Multiple R-squared:  0.07597, Adjusted R-squared:  0.03579
## F-statistic: 1.891 on 4 and 92 DF,  p-value: 0.1187

#####
mreg.tbl <- get.tbl("UNR", "load", "FrontoParietal", "just2back"); # Load quantified with 2-back trials only
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full); # full model not significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##     mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.134431 -0.021631  0.004322  0.028061  0.182581
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.001089  0.024415   0.045  0.965
## mreg.tbl$dprime.1  0.003487  0.005782   0.603  0.548
## mreg.tbl$dprime.2  0.006232  0.005905   1.055  0.294
## mreg.tbl$q.1     0.035704  0.037026   0.964  0.337
## mreg.tbl$q.2     0.002025  0.036289   0.056  0.956
##
## Residual standard error: 0.04691 on 92 degrees of freedom
## Multiple R-squared:  0.02453, Adjusted R-squared:  -0.01788
## F-statistic: 0.5783 on 4 and 92 DF,  p-value: 0.6791
```


Load, Visual

```
mreg.tbl <- get.tbl("MZ", "load", "Visual", "0and2back");
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full);      # not significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##     mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.0227946 -0.0034869 -0.0005101  0.0048074  0.0156045
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.0005117  0.0027628   0.185   0.853
## mreg.tbl$dprime.1 0.0008836  0.0009343   0.946   0.347
## mreg.tbl$dprime.2 0.0010740  0.0009793   1.097   0.276
## mreg.tbl$q.1    -0.0035356  0.0090496  -0.391   0.697
## mreg.tbl$q.2     0.0067570  0.0091214   0.741   0.461
##
## Residual standard error: 0.007458 on 90 degrees of freedom
## Multiple R-squared:  0.04375, Adjusted R-squared:  0.001248
## F-statistic: 1.029 on 4 and 90 DF,  p-value: 0.3966

#####
mreg.tbl <- get.tbl("DZ", "load", "Visual", "0and2back");
mreg.tbl <- mreg.tbl[which(!is.na(mreg.tbl$dprime.1) & !is.na(mreg.tbl$dprime.2)),]; # complete cases only
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full);      # not significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##     mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.0235643 -0.0044179  0.0007246  0.0043138  0.0146575
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.0007907  0.0035136   0.225   0.823
## mreg.tbl$dprime.1 0.0006664  0.0008516   0.783   0.436
## mreg.tbl$dprime.2 0.0006898  0.0010621   0.649   0.518
## mreg.tbl$q.1     0.0099750  0.0100770   0.990   0.326
## mreg.tbl$q.2    -0.0033109  0.0135113  -0.245   0.807
##
## Residual standard error: 0.006933 on 70 degrees of freedom
## Multiple R-squared:  0.03223, Adjusted R-squared:  -0.02307
## F-statistic: 0.5829 on 4 and 70 DF,  p-value: 0.6761

#####
mreg.tbl <- get.tbl("SIB", "load", "Visual", "0and2back");
mreg.tbl <- mreg.tbl[which(!is.na(mreg.tbl$dprime.1) & !is.na(mreg.tbl$dprime.2)),]; # complete cases only
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full);      # model and dprime.1 significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
```

```

##      mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min          1Q      Median          3Q      Max
## -0.0147319 -0.0027595 -0.0001169  0.0028090  0.0163668
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -0.0029932  0.0022968  -1.303  0.1957
## mreg.tbl$dprime.1  0.0013864  0.0005875   2.360  0.0204 *
## mreg.tbl$dprime.2  0.0009060  0.0007437   1.218  0.2263
## mreg.tbl$q.1     0.0055908  0.0083063   0.673  0.5026
## mreg.tbl$q.2     -0.0089595  0.0083592  -1.072  0.2866
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.005475 on 92 degrees of freedom
## Multiple R-squared:  0.1311, Adjusted R-squared:  0.09335
## F-statistic: 3.471 on 4 and 92 DF,  p-value: 0.01094

beta.coef(lm.full);

##
## Beta Coefficients for: lm.full
##
##      mreg.tbl$dprime.1 mreg.tbl$dprime.2 mreg.tbl$q.1 mreg.tbl$q.2
## Beta.Coeff          0.2444302          0.1304575   0.06631398  -0.1115797

#####
mreg.tbl <- get.tbl("UNR", "load", "Visual", "Oand2back");
mreg.tbl <- mreg.tbl[which(!is.na(mreg.tbl$dprime.1) & !is.na(mreg.tbl$dprime.2)),]; # complete cases only
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full); # not significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##      mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min          1Q      Median          3Q      Max
## -0.038905 -0.002914  0.000069  0.003634  0.014437
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -0.0007180  0.0036584  -0.196  0.845
## mreg.tbl$dprime.1 -0.0002122  0.0008772  -0.242  0.809
## mreg.tbl$dprime.2 -0.0003954  0.0008263  -0.479  0.633
## mreg.tbl$q.1     -0.0104681  0.0074149  -1.412  0.161
## mreg.tbl$q.2     -0.0143074  0.0074231  -1.927  0.057 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.006888 on 92 degrees of freedom
## Multiple R-squared:  0.05889, Adjusted R-squared:  0.01797
## F-statistic: 1.439 on 4 and 92 DF,  p-value: 0.2273

```

Category, FrontoParietal

```
mreg.tbl <- get.tbl("MZ", "picture", "FrontoParietal", "0and2back");
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full);

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##     mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.077812 -0.010053 -0.001834  0.010827  0.059795
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -0.0038315  0.0068215  -0.562   0.576
## mreg.tbl$dprime.1 -0.0003942  0.0022392  -0.176   0.861
## mreg.tbl$dprime.2 -0.0003250  0.0024740  -0.131   0.896
## mreg.tbl$q.1    -0.0067359  0.0245310  -0.275   0.784
## mreg.tbl$q.2    -0.1101781  0.0145418  -7.577 3.01e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01853 on 90 degrees of freedom
## Multiple R-squared:  0.4065, Adjusted R-squared:  0.3802
## F-statistic: 15.41 on 4 and 90 DF,  p-value: 1.224e-09

beta.coef(lm.full); # standardized b values (betas)

##
## Beta Coefficients for: lm.full
##
##           mreg.tbl$dprime.1 mreg.tbl$dprime.2 mreg.tbl$q.1 mreg.tbl$q.2
## Beta.Coeff   -0.01610807      -0.0120346  -0.02262651  -0.6340604

#####
mreg.tbl <- get.tbl("DZ", "picture", "FrontoParietal", "0and2back");
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full); # full model not significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##     mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.026618 -0.006698 -0.000581  0.006196  0.037037
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.002567  0.005552   0.462   0.645
## mreg.tbl$dprime.1 0.001764  0.001498   1.178   0.243
## mreg.tbl$dprime.2 0.000226  0.001758   0.129   0.898
## mreg.tbl$q.1     0.003960  0.017778   0.223   0.824
## mreg.tbl$q.2     0.017490  0.017952   0.974   0.333
##
## Residual standard error: 0.0115 on 70 degrees of freedom
## Multiple R-squared:  0.03011, Adjusted R-squared:  -0.02531
## F-statistic: 0.5434 on 4 and 70 DF,  p-value: 0.7044
```

```
#####
mreg.tbl <- get.tbl("SIB", "picture", "FrontoParietal", "Oand2back");
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full);      # full model not significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##     mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.026357 -0.006438 -0.000198  0.003950  0.034375
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.0066888  0.0037611   1.778  0.0786 .
## mreg.tbl$dprime.1  0.0005117  0.0011159   0.459  0.6476
## mreg.tbl$dprime.2 -0.0017515  0.0013056  -1.342  0.1830
## mreg.tbl$q.1     -0.0051238  0.0129622  -0.395  0.6935
## mreg.tbl$q.2     0.0035409  0.0081748   0.433  0.6659
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.009964 on 92 degrees of freedom
## Multiple R-squared:  0.02485, Adjusted R-squared:  -0.01755
## F-statistic: 0.5861 on 4 and 92 DF,  p-value: 0.6735

#####
mreg.tbl <- get.tbl("UNR", "picture", "FrontoParietal", "Oand2back");
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full);      # full model not significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##     mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.0313332 -0.0079273  0.0008288  0.0078514  0.0258614
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.0099105  0.0062900   1.576  0.119
## mreg.tbl$dprime.1 -0.0022754  0.0014426  -1.577  0.118
## mreg.tbl$dprime.2 -0.0003505  0.0014539  -0.241  0.810
## mreg.tbl$q.1     -0.0038609  0.0130902  -0.295  0.769
## mreg.tbl$q.2     0.0041510  0.0150869   0.275  0.784
##
## Residual standard error: 0.01201 on 92 degrees of freedom
## Multiple R-squared:  0.02967, Adjusted R-squared:  -0.01252
## F-statistic: 0.7033 on 4 and 92 DF,  p-value: 0.5916
```

Category, Visual, MZ twins.

```
mreg.tbl <- get.tbl("MZ", "picture", "Visual", "Oand2back");
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full); # only qs predict

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##     mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.069659 -0.013009  0.001995  0.015336  0.059254
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.047332   0.009066   5.221 1.14e-06 ***
## mreg.tbl$dprime.1 -0.002504   0.002921  -0.857   0.394
## mreg.tbl$dprime.2  0.004258   0.003056   1.393   0.167
## mreg.tbl$q.1     0.097315   0.018103   5.376 5.96e-07 ***
## mreg.tbl$q.2     0.098498   0.017101   5.760 1.16e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02324 on 90 degrees of freedom
## Multiple R-squared:  0.5294, Adjusted R-squared:  0.5085
## F-statistic: 25.31 on 4 and 90 DF, p-value: 4.607e-14

beta.coef(lm.full); # standardized b values (betas)

##
## Beta Coefficients for: lm.full
##
##           mreg.tbl$dprime.1 mreg.tbl$dprime.2 mreg.tbl$q.1 mreg.tbl$q.2
## Beta.Coeff   -0.07263105         0.1119281     0.4297969     0.4520441

lm.d12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2);
summary(lm.d12); # model significant, but not either predictor

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.069513 -0.020207 -0.005316  0.024136  0.081965
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.081061   0.011516   7.039 3.4e-10 ***
## mreg.tbl$dprime.1 0.006070   0.003834   1.583   0.117
## mreg.tbl$dprime.2 0.005646   0.004231   1.335   0.185
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03222 on 92 degrees of freedom
## Multiple R-squared:  0.07563, Adjusted R-squared:  0.05554
## F-statistic: 3.764 on 2 and 92 DF, p-value: 0.02684

anova(lm.full, lm.d12); # full MUCH better than just d primes

## Analysis of Variance Table
##
```

```

## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##   mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2
##   Res.Df      RSS Df Sum of Sq      F Pr(>F)
## 1      90 0.048615
## 2      92 0.095494 -2 -0.04688 43.394 6.39e-14 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

lm.q12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.q12); # significant, as are both predictors

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.069548 -0.014353  0.001465  0.014522  0.059775
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.051957   0.006425   8.087 2.38e-12 ***
## mreg.tbl$q.1  0.095972   0.017478   5.491 3.52e-07 ***
## mreg.tbl$q.2  0.098645   0.016820   5.865 6.99e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02325 on 92 degrees of freedom
## Multiple R-squared:  0.5187, Adjusted R-squared:  0.5082
## F-statistic: 49.57 on 2 and 92 DF,  p-value: 2.464e-15

anova(lm.full, lm.q12); # full NOT better than just single-subject q scores

## Analysis of Variance Table
##
## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##   mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2
##   Res.Df      RSS Df Sum of Sq      F Pr(>F)
## 1      90 0.048615
## 2      92 0.049723 -2 -0.0011087 1.0263 0.3625

```

Category, Visual, DZ twins.

```
mreg.tbl <- get.tbl("DZ", "picture", "Visual", "Oand2back");
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full); # only qs predict

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##     mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.044050 -0.014475  0.001666  0.013334  0.053723
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.0302516  0.0098804   3.062  0.00312 **
## mreg.tbl$dprime.1 0.0035348  0.0023793   1.486  0.14187
## mreg.tbl$dprime.2 -0.0004074  0.0031917  -0.128  0.89879
## mreg.tbl$q.1     0.0884379  0.0181564   4.871 6.66e-06 ***
## mreg.tbl$q.2     0.0900441  0.0186685   4.823 7.96e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01958 on 70 degrees of freedom
## Multiple R-squared:  0.5091, Adjusted R-squared:  0.481
## F-statistic: 18.15 on 4 and 70 DF,  p-value: 2.882e-10

beta.coef(lm.full);

##
## Beta Coefficients for: lm.full
##
##           mreg.tbl$dprime.1 mreg.tbl$dprime.2 mreg.tbl$q.1 mreg.tbl$q.2
## Beta.Coeff      0.1303434      -0.01193948    0.4228271    0.4496157

lm.d12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2);
summary(lm.d12); # significant, as are both predictors

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.05406 -0.01449 -0.00094  0.01109  0.07391
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.053632  0.012104   4.431 3.29e-05 ***
## mreg.tbl$dprime.1 0.005981  0.003071   1.948  0.0554 .
## mreg.tbl$dprime.2 0.008184  0.003865   2.118  0.0376 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02567 on 72 degrees of freedom
## Multiple R-squared:  0.1321, Adjusted R-squared:  0.108
## F-statistic: 5.478 on 2 and 72 DF,  p-value: 0.006099

anova(lm.full, lm.d12); # full MUCH better than just d primes

## Analysis of Variance Table
##
```

```

## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##   mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2
##   Res.Df      RSS Df Sum of Sq      F Pr(>F)
## 1      70 0.026846
## 2      72 0.047462 -2 -0.020616 26.879 2.18e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

lm.q12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.q12); # significant, as are both predictors

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.046876 -0.016011  0.000746  0.014658  0.048046
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.03673    0.00701   5.240 1.53e-06 ***
## mreg.tbl$q.1  0.08916    0.01793   4.973 4.33e-06 ***
## mreg.tbl$q.2  0.09554    0.01717   5.565 4.24e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01961 on 72 degrees of freedom
## Multiple R-squared:  0.4935, Adjusted R-squared:  0.4795
## F-statistic: 35.08 on 2 and 72 DF, p-value: 2.313e-11

anova(lm.full, lm.q12); # full NOT better than just single-subject q scores

## Analysis of Variance Table
##
## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##   mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2
##   Res.Df      RSS Df Sum of Sq      F Pr(>F)
## 1      70 0.026846
## 2      72 0.027697 -2 -0.00085116 1.1097 0.3354

```


Category, Visual, SIB.

```
mreg.tbl <- get.tbl("SIB", "picture", "Visual", "0and2back");
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full); # only qs predict

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##     mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.040355 -0.012354 -0.002048  0.012504  0.054964
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.040402   0.009031   4.474 2.2e-05 ***
## mreg.tbl$dprime.1 0.001456   0.002174   0.669 0.504864
## mreg.tbl$dprime.2 0.002811   0.002749   1.022 0.309266
## mreg.tbl$q.1     0.073632   0.018165   4.054 0.000105 ***
## mreg.tbl$q.2     0.051351   0.015083   3.405 0.000983 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02032 on 92 degrees of freedom
## Multiple R-squared:  0.3068, Adjusted R-squared:  0.2766
## F-statistic: 10.18 on 4 and 92 DF,  p-value: 7.231e-07

beta.coef(lm.full);

##
## Beta Coefficients for: lm.full
##
##           mreg.tbl$dprime.1 mreg.tbl$dprime.2 mreg.tbl$q.1 mreg.tbl$q.2
## Beta.Coeff      0.06178332      0.09743839      0.3568729      0.3118903

lm.d12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2);
summary(lm.d12); # significant; dprime.2 is as a predictor

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.041316 -0.015150 -0.000753  0.011328  0.062653
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.067911   0.008527   7.964 3.8e-12 ***
## mreg.tbl$dprime.1 0.002746   0.002471   1.111  0.2693
## mreg.tbl$dprime.2 0.006105   0.003026   2.017  0.0465 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02322 on 94 degrees of freedom
## Multiple R-squared:  0.07435, Adjusted R-squared:  0.05466
## F-statistic: 3.775 on 2 and 94 DF,  p-value: 0.02648

anova(lm.full, lm.d12); # full MUCH better than just d primes

## Analysis of Variance Table
##
```

```

## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##   mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2
##   Res.Df      RSS Df Sum of Sq      F      Pr(>F)
## 1      92 0.037971
## 2      94 0.050703 -2 -0.012732 15.424 1.672e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

lm.q12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.q12); # significant, as are both predictors

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.042960 -0.013780 -0.000242  0.011683  0.058219
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.048430   0.007089   6.832 8.25e-10 ***
## mreg.tbl$q.1  0.076336   0.018058   4.227 5.48e-05 ***
## mreg.tbl$q.2  0.057508   0.014410   3.991 0.00013 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02032 on 94 degrees of freedom
## Multiple R-squared:  0.2913, Adjusted R-squared:  0.2762
## F-statistic: 19.32 on 2 and 94 DF,  p-value: 9.39e-08

anova(lm.full, lm.q12); # full NOT better than just single-subject q scores

## Analysis of Variance Table
##
## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##   mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2
##   Res.Df      RSS Df  Sum of Sq      F Pr(>F)
## 1      92 0.037971
## 2      94 0.038821 -2 -0.00085009 1.0298 0.3611

```

Category, Visual, UNR.

```
mreg.tbl <- get.tbl("UNR", "picture", "Visual", "0and2back");
lm.full <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 + mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.full); # only qs predict

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##     mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.053430 -0.010197 -0.000575  0.015225  0.053305
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.0219564  0.0106900   2.054  0.04282 *
## mreg.tbl$dprime.1 0.0009094  0.0024340   0.374  0.70953
## mreg.tbl$dprime.2 0.0039241  0.0024606   1.595  0.11419
## mreg.tbl$q.1    0.0815252  0.0138797   5.874 6.72e-08 ***
## mreg.tbl$q.2    0.0430221  0.0145935   2.948  0.00405 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01934 on 92 degrees of freedom
## Multiple R-squared:  0.36, Adjusted R-squared:  0.3322
## F-statistic: 12.94 on 4 and 92 DF,  p-value: 2.13e-08

beta.coef(lm.full);

##
## Beta Coefficients for: lm.full
##
##      mreg.tbl$dprime.1 mreg.tbl$dprime.2 mreg.tbl$q.1 mreg.tbl$q.2
## Beta.Coeff           0.03545951           0.1544924    0.5231525    0.2736967

lm.d12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2);
summary(lm.d12); # model not significant

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.058312 -0.010293 -0.001778  0.014279  0.067638
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.046336  0.012125   3.822 0.000238 ***
## mreg.tbl$dprime.1 0.003996  0.002794   1.430 0.155986
## mreg.tbl$dprime.2 0.005234  0.002767   1.891 0.061673 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.0234 on 94 degrees of freedom
## Multiple R-squared:  0.04255, Adjusted R-squared:  0.02217
## F-statistic: 2.089 on 2 and 94 DF,  p-value: 0.1296

lm.q12 <- lm(mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2);
summary(lm.q12); # significant, as are both predictors
```

```

##
## Call:
## lm(formula = mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.054407 -0.010858 -0.001623  0.013989  0.050572
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.033024   0.005798   5.696 1.40e-07 ***
## mreg.tbl$q.1  0.078942   0.013063   6.043 3.02e-08 ***
## mreg.tbl$q.2  0.051496   0.013176   3.908 0.000175 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01939 on 94 degrees of freedom
## Multiple R-squared:  0.3423, Adjusted R-squared:  0.3283
## F-statistic: 24.46 on 2 and 94 DF,  p-value: 2.799e-09

anova(lm.full, lm.q12); # full NOT better than just single-subject q scores

## Analysis of Variance Table
##
## Model 1: mreg.tbl$q.pairwise ~ mreg.tbl$dprime.1 + mreg.tbl$dprime.2 +
##      mreg.tbl$q.1 + mreg.tbl$q.2
## Model 2: mreg.tbl$q.pairwise ~ mreg.tbl$q.1 + mreg.tbl$q.2
##   Res.Df    RSS Df Sum of Sq   F Pr(>F)
## 1      92 0.034402
## 2      94 0.035354 -2 -0.00095148 1.2722 0.2851

```