Verbs PhysPsych: Analysis

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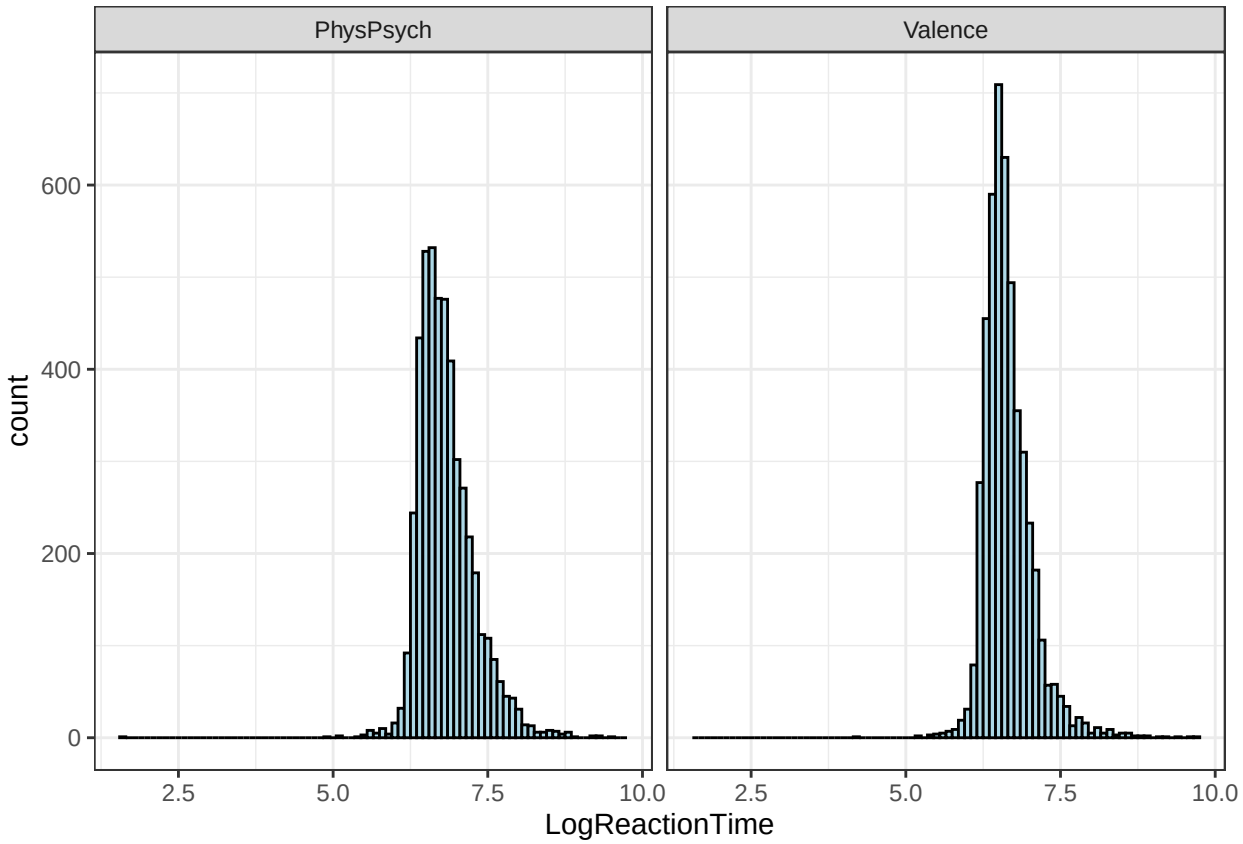
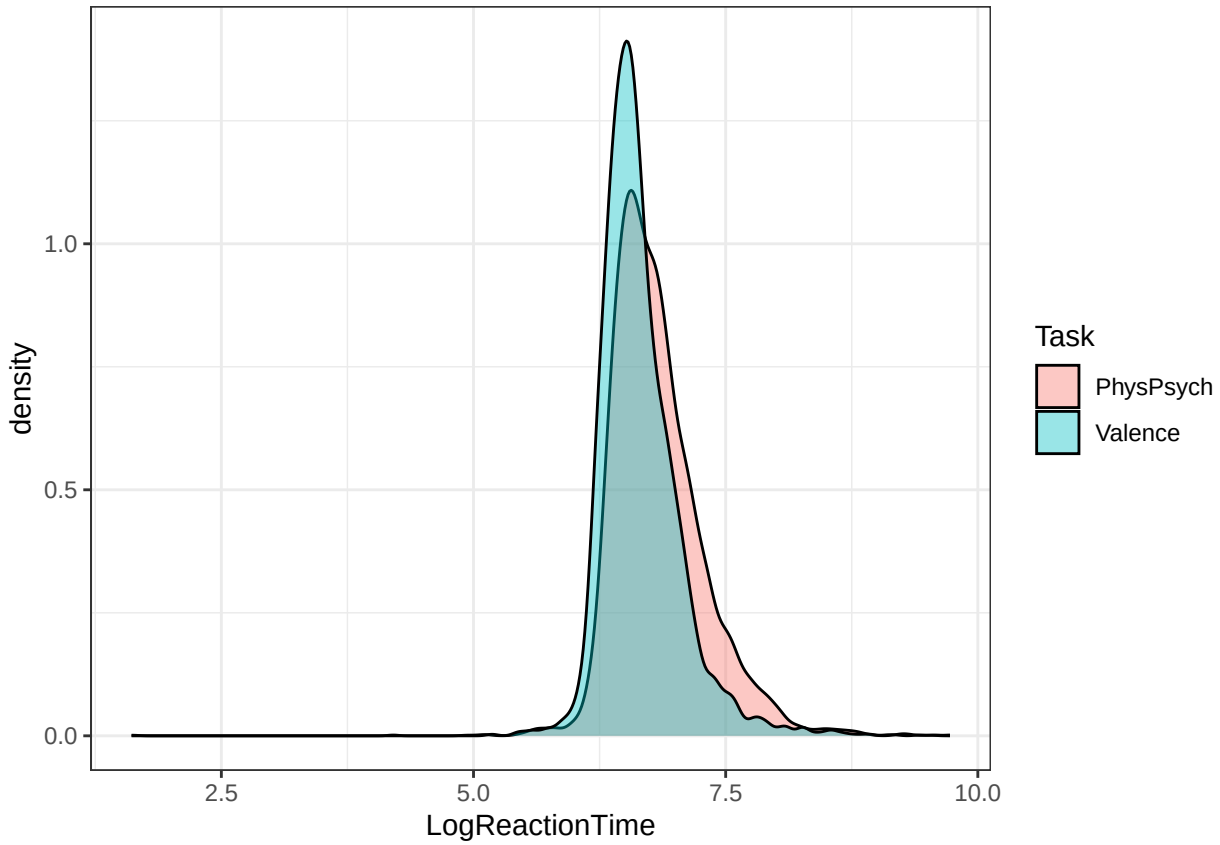
```
ggplot(d, aes(x=LogReactionTime)) +
  geom_histogram(binwidth = .1,fill = "lightblue", color = "black") +
  facet_wrap(~Task)
```




```
ggplot(d, aes(x=LogReactionTime, fill=Task)) +
  geom_density(alpha = .4)
```




```
names(d)
```

```
##  [1] "X"               "ID.true"         "Word"            "Label"
##  [5] "ConcValCombo"    "Task"            "BlockOrder"      "Group"
##  [9] "Response"        "Accuracy"        "EventTime"       "Value"
## [13] "RT"              "ReactionTime"    "Key_value_F"     "Key_value_J"
## [17] "Comments"        "LogReactionTime" "LogRT"           "TrialNumber"
```

```
dcen <- d %>%
  mutate(Word = as.factor(Word),
         ID.true = as.factor(ID.true),
         Task = as.factor(Task),
         cAccuracy = as.numeric(Accuracy)-mean(as.numeric(Accuracy)),
         cTask = as.numeric(Task)-mean(as.numeric(Task)))

m <- lmer(LogReactionTime ~ cAccuracy*cTask + (1+cTask|Word) + (1+cTask|ID.true), data = dcen)
summary(m)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: LogReactionTime ~ cAccuracy * cTask + (1 + cTask | Word) + (1 +
##     cTask | ID.true)
##    Data: dcen
##
## REML criterion at convergence: 7697.2
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
```

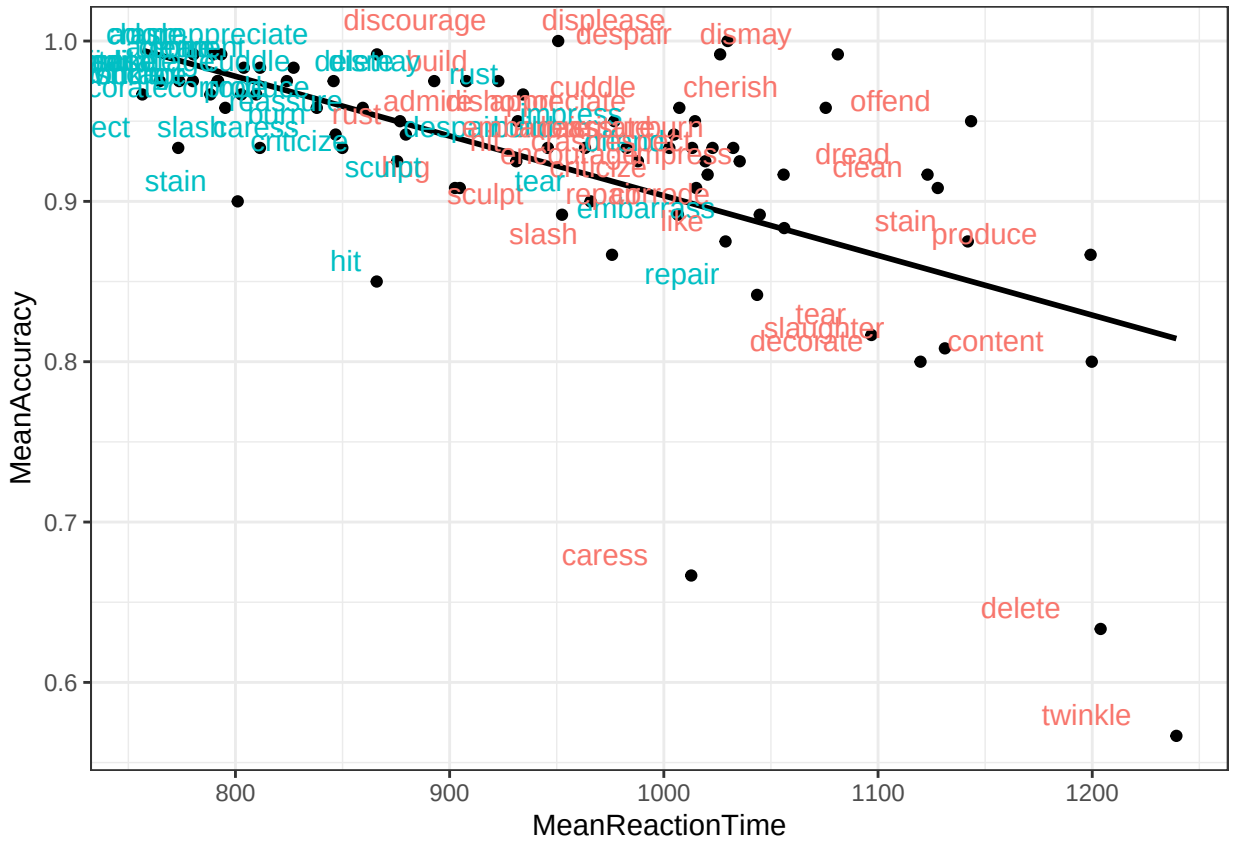
```
## -12.8138  -0.5954  -0.1592   0.4163   8.8914
##
## Random effects:
##  Groups   Name        Variance Std.Dev. Corr
##  Word     (Intercept) 0.001660 0.04075
##           cTask       0.007262 0.08522  0.01
##  ID.true  (Intercept) 0.044859 0.21180
##           cTask       0.030378 0.17429  -0.24
##  Residual             0.124966 0.35351
## Number of obs: 9600, groups:  Word, 40; ID.true, 40
##
## Fixed effects:
##                   Estimate Std. Error         df t value Pr(>|t|)
## (Intercept)        6.73755    0.03430   41.82118 196.455  < 2e-16 ***
## cAccuracy          0.05322    0.01543 9516.67355   3.449 0.000565 ***
## cTask             -0.17925    0.03152   54.00888  -5.686  5.4e-07 ***
## cAccuracy:cTask    0.07642    0.03084 9516.18135   2.477 0.013248 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) cAccrc cTask
## cAccuracy   -0.004
## cTask       -0.204 -0.028
## cAccrcy:cTs -0.013  0.318 -0.009
```

```
agr <- d %>%
  group_by(Word,Task) %>%
  summarize(MeanAccuracy = mean(Accuracy),
            MeanReactionTime = mean(ReactionTime))
```

```
## `summarise()` has grouped output by 'Word'. You can override using the
## `.groups` argument.
```

```
ggplot(agr, aes(x = MeanReactionTime, y = MeanAccuracy)) +
  geom_point() +
  geom_smooth(method = "lm", se = FALSE, color = "black") +
  geom_text(aes(label = Word, color = Task), vjust = -0.5, hjust = 1.5) +
  # guides(legend = "none")
  theme(legend.position = "none")  # Remove the legend
```

```
## `geom_smooth()` using formula = 'y ~ x'
```




```
ggsave("../graphs/exp1b_accXrt.pdf",width = 5, height = 3)
```

```
## `geom_smooth()` using formula = 'y ~ x'
```

```
# Compute highest accuracy for PhysPsych
physical_accuracy <- d %>%
  group_by(Word,Task) %>%
  summarize(MeanAccuracy = mean(Accuracy),
            MeanReactionTime = mean(ReactionTime)) %>%
  filter(Task == "PhysPsych") %>%
  select(Word, MeanAccuracy) %>%
  rename(PhysPsychAccuracy = MeanAccuracy) %>%
  arrange(desc(PhysPsychAccuracy)) %>%
  head(10)
```

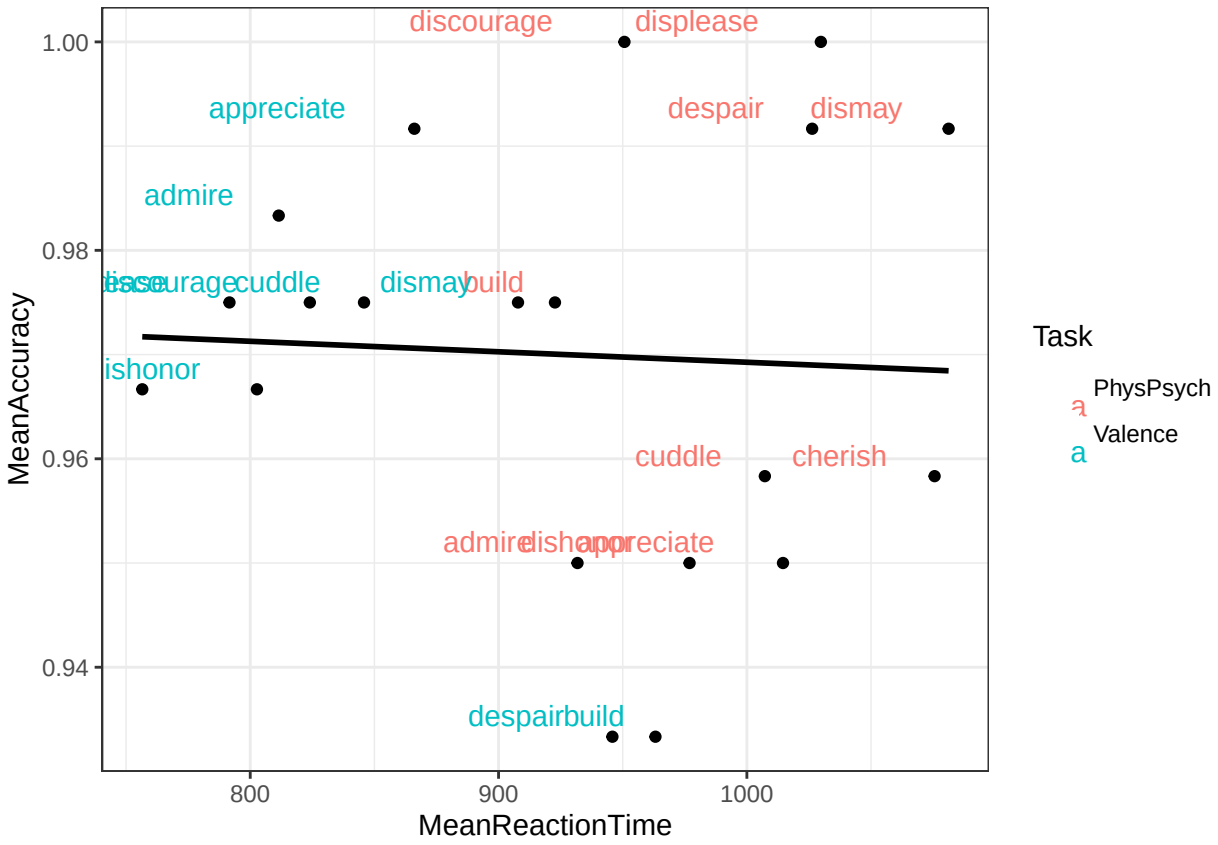
```
## `summarise()` has grouped output by 'Word'. You can override using the
## `.groups` argument.
```

```
View(physical_accuracy)


agr <- d %>%
  filter(Word %in% physical_accuracy$Word) %>%
  group_by(Word,Task) %>%
  summarize(MeanAccuracy = mean(Accuracy),
            MeanReactionTime = mean(ReactionTime))
```

```
## `summarise()` has grouped output by 'Word'. You can override using the
## `.groups` argument.
```

```
ggplot(agr, aes(x = MeanReactionTime, y = MeanAccuracy)) +
  geom_point() +
  geom_smooth(method = "lm", se = FALSE, color = "black") +
  geom_text(aes(label = Word, color = Task), vjust = -0.5, hjust = 1.5)
```

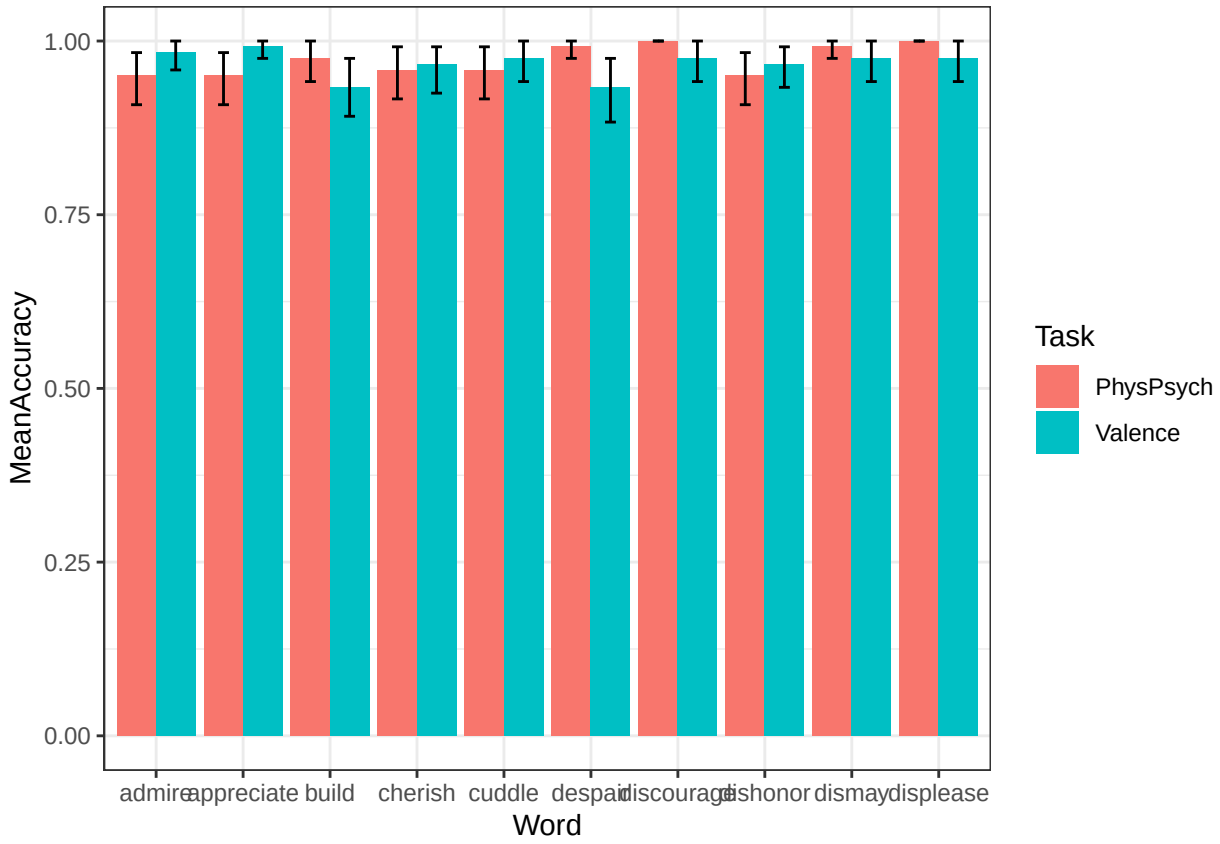
```
## `geom_smooth()` using formula = 'y ~ x'
```



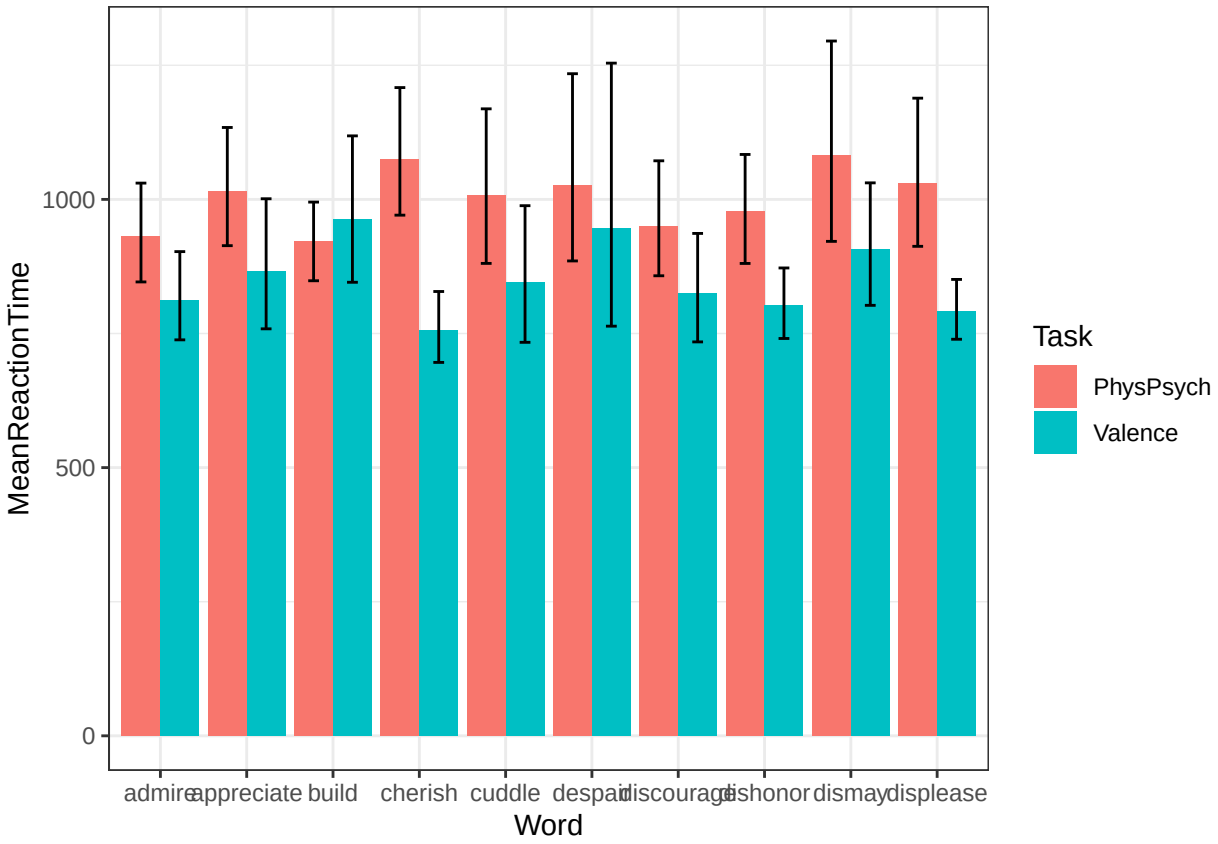

```
  # guides(legend = "none")
  # theme(legend.position = "none")  # Remove the legend
ggsave("../graphs/exp1b_accXrt.pdf",width = 5, height = 3)
```

```
## `geom_smooth()` using formula = 'y ~ x'
```

```
agr <- d %>%
  filter(Word %in% physical_accuracy$Word) %>%
  group_by(Word,Task) %>%
  reframe(MeanAccuracy = mean(Accuracy),
          CILow = ci.low(Accuracy),
          CIHigh = ci.high(Accuracy)) %>%
  mutate(YMin = MeanAccuracy - CILow,
         YMax = MeanAccuracy + CIHigh)
# View(agr)

dodge = position_dodge(.9)
ggplot(data=agr, aes(x=Word,y=MeanAccuracy, fill = Task)) +
  geom_bar(position=dodge,stat="identity") +
  geom_errorbar(aes(ymin=YMin,ymax=YMax),width=.25,position=position_dodge(0.9))
```




```
agr <- d %>%
  filter(Word %in% physical_accuracy$Word) %>%
  group_by(Word,Task) %>%
  reframe(MeanReactionTime = mean(ReactionTime),
          CILow = ci.low(ReactionTime),
          CIHigh = ci.high(ReactionTime)) %>%
  mutate(YMin = MeanReactionTime - CILow,
         YMax = MeanReactionTime + CIHigh)
# View(agr)

dodge = position_dodge(.9)
ggplot(data=agr, aes(x=Word,y=MeanReactionTime, fill = Task)) +
  geom_bar(position=dodge,stat="identity") +
  geom_errorbar(aes(ymin=YMin,ymax=YMax),width=.25,position=position_dodge(0.9))
```



First Remove participants who aren't super , aggregating over Task

```
length(unique(d$ID.true))
```

```
## [1] 40
```

```
inacc.parts <- d %>%
  group_by(ID.true) %>%
  summarise(MeanAccuracy = mean(Accuracy)) %>%
  filter(MeanAccuracy < .75)

# How many participants have Accuracy < .75?
length(unique(inacc.parts$ID.true))
```

```
## [1] 1
```

```
d.inaccurate.removed <- d %>%
  anti_join(inacc.parts, by = "ID.true")

# Sanity check
length(unique(d.inaccurate.removed$ID.true))
```

```
## [1] 39
```

```
# remove all inaccurate trials
orig <- nrow(d.inaccurate.removed)
d.inaccurate.removed <- d.inaccurate.removed %>%
  filter(Accuracy == 1)
```

```r
nrow(d.inaccurate.removed)/orig*100
```

```
## [1] 92.77778
```

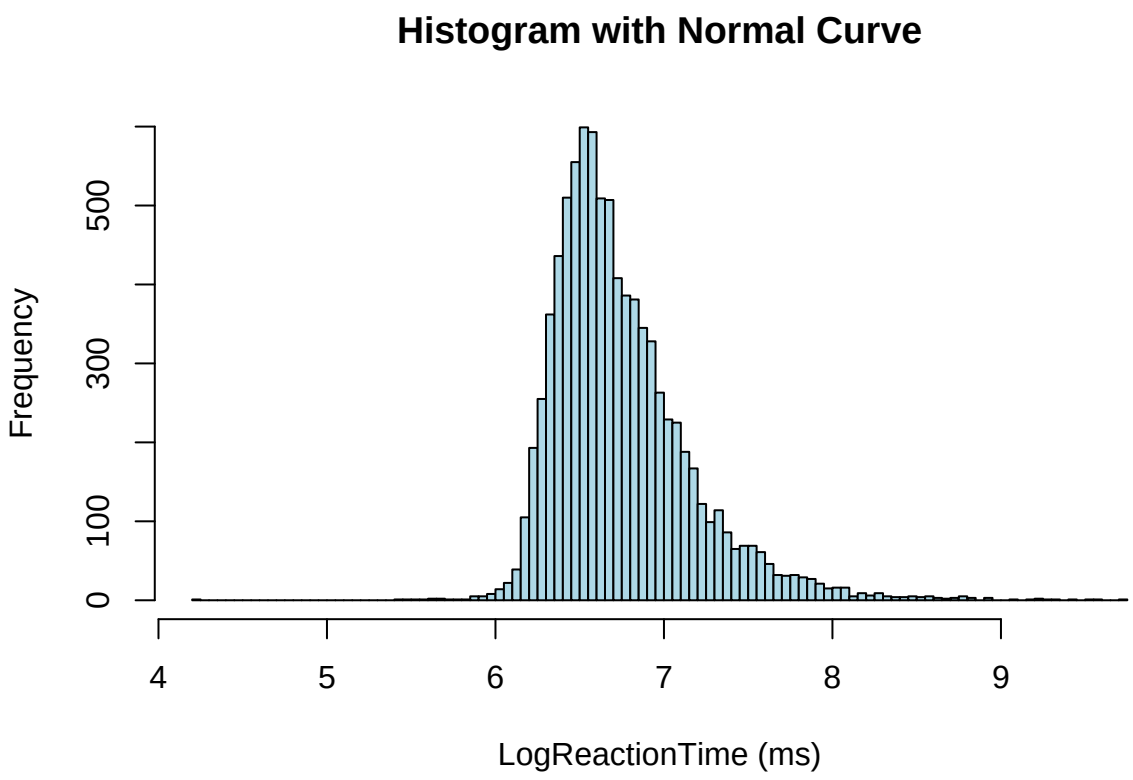
```r
# Remove subjects with ReactionTime higher than 3x IQR
summary(d.inaccurate.removed$LogReactionTime)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   4.205   6.468   6.662   6.749   6.941   9.724
```

```r
  #  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  # 6.924   7.328   7.436   7.479   7.579  10.008
range(d.inaccurate.removed$LogReactionTime)
```

```
## [1] 4.204693 9.723942
```

```r
hist(d.inaccurate.removed$LogReactionTime, breaks=100, col="lightblue", xlab="LogReactionTime (ms)",
        main="Histogram with Normal Curve")
```




```r
quantile(d.inaccurate.removed$LogReactionTime)
```

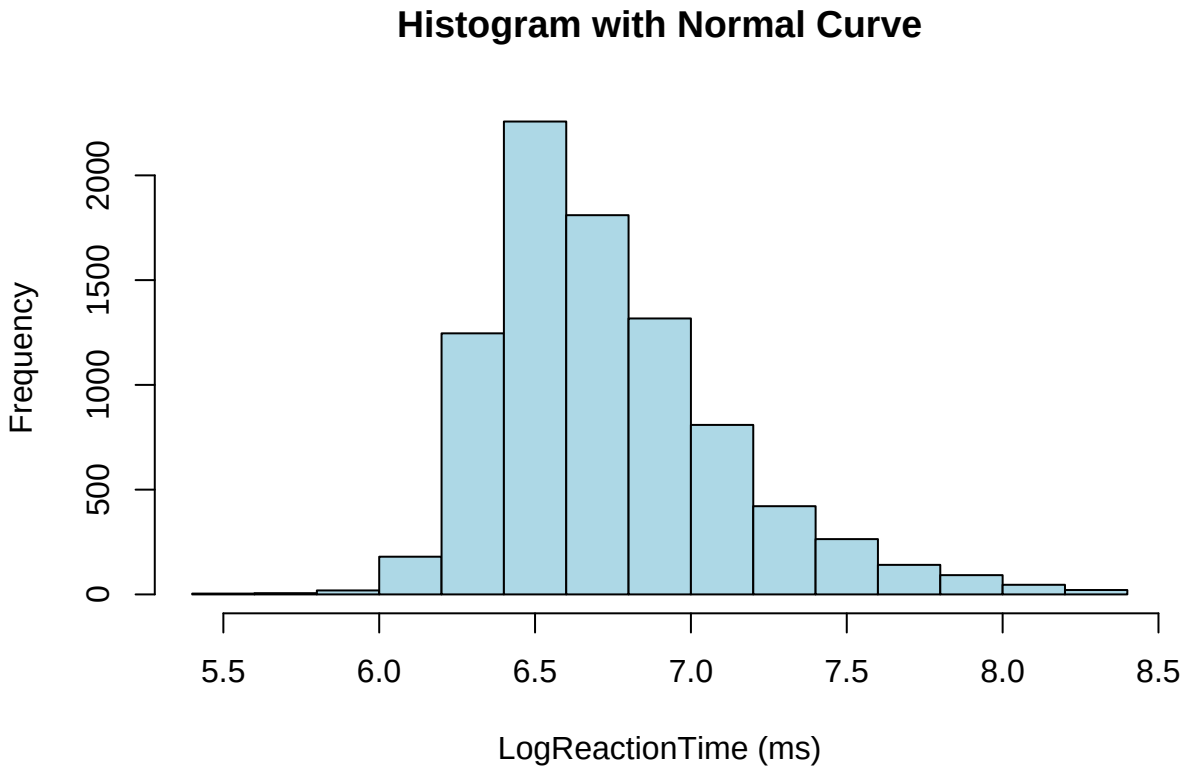
```
##       0%      25%      50%      75%     100%
## 4.204693 6.467699 6.661855 6.941190 9.723942
```

```r
IQR(d.inaccurate.removed$LogReactionTime)*3 # 0.7526289
```

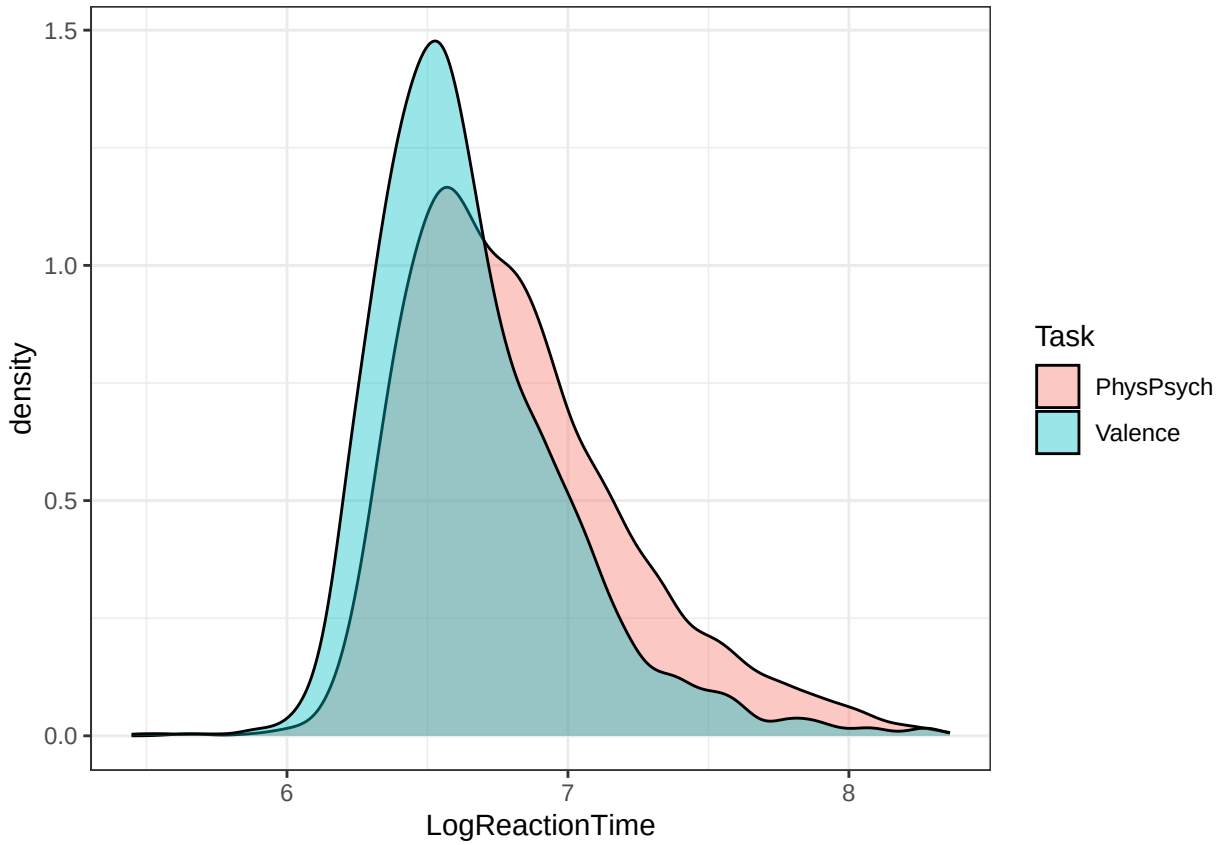
```
## [1] 1.420474
```

```r
cutoff.high <- quantile(d.inaccurate.removed$LogReactionTime)[4] + IQR(d.inaccurate.removed$LogReaction
cutoff.low <- quantile(d.inaccurate.removed$LogReactionTime)[2] - IQR(d.inaccurate.removed$LogReactionT


# remove subjects with ReactionTime higher than 3 x IQR
```

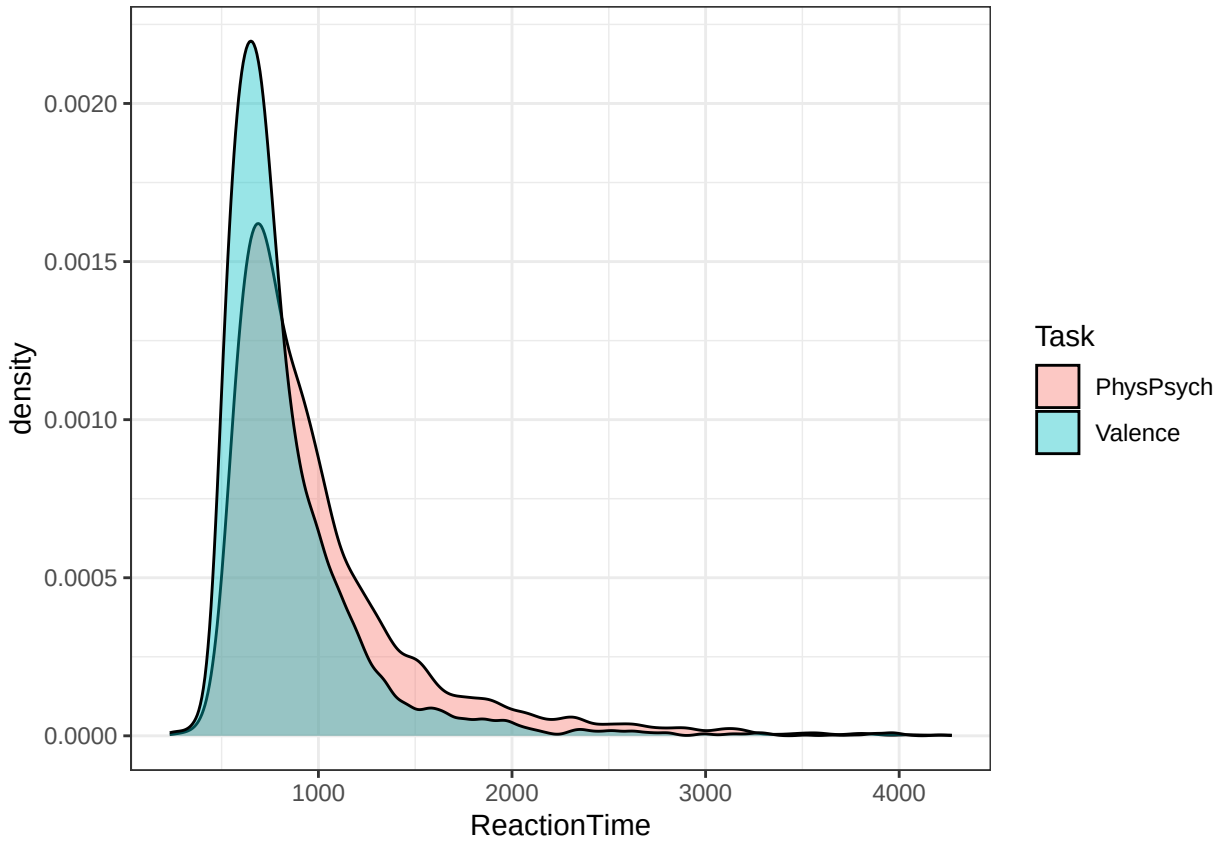
```r
df.outliers.removed <- subset(d.inaccurate.removed, (d.inaccurate.removed$LogReactionTime > cutoff.low)

hist(df.outliers.removed$LogReactionTime, col="lightblue", xlab="LogReactionTime (ms)",
        main="Histogram with Normal Curve")
```




```r
ggplot(df.outliers.removed, aes(x=LogReactionTime, fill=Task)) +
  # facet_wrap(~BlockOrder) +
  geom_density(alpha = .4)
```




```
ggplot(df.outliers.removed, aes(x=ReactionTime, fill=Task)) +
  # facet_wrap(~BlockOrder) +
  geom_density(alpha = .4)
```



convert everything to factors

Is there a difference between Semantic and Valence Tasks?

Yes

```
m = lmer(LogReactionTime ~ cTask + (1+cTask|ID.true) + (1+cTask|Word), data=center)
summary(m)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: LogReactionTime ~ cTask + (1 + cTask | ID.true) + (1 + cTask |
##     Word)
##    Data: center
##
## REML criterion at convergence: 4795.6
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.1938 -0.6357 -0.1660  0.4655  5.1608
##
## Random effects:
##  Groups   Name        Variance Std.Dev. Corr
##  Word     (Intercept) 0.001930 0.04393
##           cTask       0.008116 0.09009  -0.02
##  ID.true  (Intercept) 0.034125 0.18473
##           cTask       0.023164 0.15220  -0.16
```

```
##  Residual             0.097283 0.31190
## Number of obs: 8633, groups:  Word, 40; ID.true, 39
##
## Fixed effects:
##             Estimate Std. Error       df t value Pr(>|t|)
## (Intercept)  6.74074    0.03057 42.05588 220.483  < 2e-16 ***
## cTask       -0.17545    0.02903 56.97676  -6.044 1.22e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##       (Intr)
## cTask -0.131
```

Is there an Interaction between Task and WordType (ConcValCombo)?

Y.

```
m = lmer(LogReactionTime ~ cTask*ConcValCombo + (1+ConcValCombo+cTask|ID.true) + (1+cTask|Word), data=c
```

```
## Warning in checkConv(attr(opt, "derivs"), opt$par, ctrl = control$checkConv, :
## Model failed to converge with max|grad| = 0.00251859 (tol = 0.002, component 1)
```

```
# saveRDS(m, "../models/model-Task-ConcValCombo_outlier_excl_ReactionTime_corrected.rds")

# m <- readRDS("../models/model-Task-ConcValCombo_outlier_excl_ReactionTime_corrected.rds")
summary(m)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: LogReactionTime ~ cTask * ConcValCombo + (1 + ConcValCombo +
##     cTask | ID.true) + (1 + cTask | Word)
##    Data: center
##
## REML criterion at convergence: 4756.8
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.2051 -0.6275 -0.1637  0.4526  5.1489
##
## Random effects:
##  Groups   Name                                Variance Std.Dev. Corr
##  Word     (Intercept)                         0.002065 0.04545
##           cTask                               0.008248 0.09082  -0.03
##  ID.true  (Intercept)                         0.037302 0.19314
##           ConcValCombophysical-positive       0.003800 0.06164  -0.47
##           ConcValCombopsychological-negative  0.003209 0.05664   0.00  0.22
##           ConcValCombopsychological-positive  0.005208 0.07217  -0.28  0.29
##           cTask                               0.022833 0.15111  -0.10  0.03
##  Residual                                     0.095725 0.30939
##
##
##
```

```
##
##
##
##   0.87
##  -0.47 -0.10
##
## Number of obs: 8633, groups:  Word, 40; ID.true, 39
##
## Fixed effects:
##                                           Estimate Std. Error         df
## (Intercept)                                6.7510020  0.0347710 51.7011932
## cTask                                     -0.1731257  0.0399361 65.3056006
## ConcValCombophysical-positive             -0.0009973  0.0245581 45.4164532
## ConcValCombopsychological-negative        -0.0207988  0.0241730 43.6256889
## ConcValCombopsychological-positive        -0.0162728  0.0252217 48.5824217
## cTask:ConcValCombophysical-positive        0.0057417  0.0449570 35.9184535
## cTask:ConcValCombopsychological-negative   0.0271791  0.0447885 35.3933473
## cTask:ConcValCombopsychological-positive -0.0466539  0.0448151 35.4775001
##                                          t value Pr(>|t|)
## (Intercept)                              194.156  < 2e-16 ***
## cTask                                     -4.335 5.15e-05 ***
## ConcValCombophysical-positive             -0.041    0.968
## ConcValCombopsychological-negative        -0.860    0.394
## ConcValCombopsychological-positive        -0.645    0.522
## cTask:ConcValCombophysical-positive        0.128    0.899
## cTask:ConcValCombopsychological-negative   0.607    0.548
## cTask:ConcValCombopsychological-positive  -1.041    0.305
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##                            (Intr) cTask  CncVlCmbph- CncVlCmbpsychlgcl-n
## cTask                      -0.066
## CncVlCmbph-                -0.465  0.021
## CncVlCmbpsychlgcl-n        -0.300 -0.092  0.458
## CncVlCmbpsychlgcl-p        -0.402 -0.014  0.461       0.563
## cTsk:CncVlCmbph-            0.009 -0.562 -0.027      -0.013
## cTsk:CncVlCmbpsychlgcl-n    0.009 -0.564 -0.013      -0.022
## cTsk:CncVlCmbpsychlgcl-p    0.009 -0.564 -0.013      -0.013
##                            CncVlCmbpsychlgcl-p cTsk:CncVlCmbph-
## cTask
## CncVlCmbph-
## CncVlCmbpsychlgcl-n
## CncVlCmbpsychlgcl-p
## cTsk:CncVlCmbph-           -0.012
## cTsk:CncVlCmbpsychlgcl-n   -0.012               0.501
## cTsk:CncVlCmbpsychlgcl-p   -0.023               0.501
##                            cTsk:CncVlCmbpsychlgcl-n
## cTask
## CncVlCmbph-
## CncVlCmbpsychlgcl-n
## CncVlCmbpsychlgcl-p
## cTsk:CncVlCmbph-
## cTsk:CncVlCmbpsychlgcl-n
```

```
## cTsk:CncVlCmbpsychlgcl-p  0.503
## optimizer (nloptwrap) convergence code: 0 (OK)
## Model failed to converge with max|grad| = 0.00251859 (tol = 0.002, component 1)
```

Main Effect of Block Order

On ReactionTime

- No.

```
m = lmer(LogReactionTime ~ cBlockOrder + (1|ID.true) + (1+cBlockOrder|Word), data=center)

summary(m)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: LogReactionTime ~ cBlockOrder + (1 | ID.true) + (1 + cBlockOrder |
##     Word)
##    Data: center
##
## REML criterion at convergence: 5841.8
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.8249 -0.6535 -0.1954  0.4503  4.8937
##
## Random effects:
##  Groups   Name        Variance  Std.Dev. Corr
##  Word     (Intercept) 1.696e-03 0.04118
##           cBlockOrder 1.165e-06 0.00108  1.00
##  ID.true  (Intercept) 3.440e-02 0.18548
##  Residual             1.122e-01 0.33493
## Number of obs: 8633, groups:  Word, 40; ID.true, 39
##
## Fixed effects:
##             Estimate Std. Error       df t value Pr(>|t|)
## (Intercept)  6.74063    0.03062 40.41773  220.12   <2e-16 ***
## cBlockOrder -0.01019    0.05986 36.97625   -0.17    0.866
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr)
## cBlockOrder -0.010
```

effect of ConcValCombo on ReactionTime?

nope.

```
m = lmer(LogReactionTime ~ ConcValCombo + (1+ConcValCombo|ID.true) + (1|Word), data=center)

summary(m)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
```

```
## Formula: LogReactionTime ~ ConcValCombo + (1 + ConcValCombo | ID.true) +
##     (1 | Word)
##    Data: center
##
## REML criterion at convergence: 5812.7
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.8221 -0.6457 -0.1873  0.4446  5.0343
##
## Random effects:
##  Groups   Name                                Variance Std.Dev. Corr
##  Word     (Intercept)                         0.001859 0.04311
##  ID.true  (Intercept)                         0.036680 0.19152
##           ConcValCombophysical-positive       0.003514 0.05928  -0.51
##           ConcValCombopsychological-negative 0.002568 0.05068   0.05  0.17
##           ConcValCombopsychological-positive 0.004359 0.06602  -0.30  0.33
##  Residual                                     0.110869 0.33297
##
##
##
##
##
##   0.92
##
## Number of obs: 8633, groups:  Word, 40; ID.true, 39
##
## Fixed effects:
##                                    Estimate Std. Error        df t value
## (Intercept)                         6.748257   0.034341 50.352385 196.506
## ConcValCombophysical-positive      -0.001209   0.023838 43.971561  -0.051
## ConcValCombopsychological-negative -0.014892   0.023244 41.375567  -0.641
## ConcValCombopsychological-positive -0.012456   0.024225 45.982065  -0.514
##                                   Pr(>|t|)
## (Intercept)                         <2e-16 ***
## ConcValCombophysical-positive         0.960
## ConcValCombopsychological-negative    0.525
## ConcValCombopsychological-positive    0.610
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##                     (Intr) CncVlCmbph- CncVlCmbpsychlgcl-n
## CncVlCmbph-         -0.471
## CncVlCmbpsychlgcl-n -0.284  0.455
## CncVlCmbpsychlgcl-p -0.406  0.471       0.565
```

In the PhysPsychness task, is there a difference between physicalness and psychologicalness on ReactionTime?

- Nope

```r
str(df_factors)
```

```
## 'data.frame':    8633 obs. of  20 variables:
##  $ X              : Factor w/ 8633 levels "1","2","3","4",..: 1 2 3 4 5 6 7 8 9 10 ...
##  $ ID.true        : Factor w/ 39 levels "561d98e03d7fe8000b0f5e09",..: 7 7 7 7 7 7 7 7 7 7 ...
##  $ Word           : Factor w/ 40 levels "admire","adore",..: 18 2 28 33 19 3 38 5 22 34 ...
##  $ Label          : Factor w/ 2 levels "test_physpsych",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ ConcValCombo   : Factor w/ 4 levels "physical-negative",..: 3 4 4 4 3 4 1 1 3 1 ...
##  $ Task           : Factor w/ 2 levels "PhysPsych","Valence": 1 1 1 1 1 1 1 1 1 1 ...
##  $ BlockOrder     : Factor w/ 2 levels "PV","VP": 1 1 1 1 1 1 1 1 1 1 ...
##  $ Group          : Factor w/ 2 levels "A","B": 2 2 2 2 2 2 2 2 2 2 ...
##  $ Response       : Factor w/ 4 levels "negative","physical",..: 4 4 4 4 4 4 2 2 4 2 ...
##  $ Accuracy       : Factor w/ 1 level "1": 1 1 1 1 1 1 1 1 1 1 ...
##  $ EventTime      : Factor w/ 8633 levels "1743431576181",..: 5371 5372 5373 5374 5375 5376 5377 5378
##  $ Value          : Factor w/ 4 levels "negative","physical",..: 4 4 4 4 4 4 2 2 4 2 ...
##  $ RT             : Factor w/ 1344 levels "1282.5","1284.5",..: 4 27 5 146 31 132 36 129 17 388 ...
##  $ ReactionTime   : int  535 697 735 560 851 924 612 513 627 1516 ...
##  $ Key_value_F    : Factor w/ 2 levels "A","B": 2 2 2 2 2 2 2 2 2 2 ...
##  $ Key_value_J    : Factor w/ 4 levels "negative;positive",..: 4 4 4 4 4 4 4 4 4 4 ...
##  $ Comments       : Factor w/ 0 levels: NA NA NA NA NA NA NA NA NA NA ...
##  $ LogReactionTime: num  6.28 6.55 6.6 6.33 6.75 ...
##  $ LogRT          : Factor w/ 1344 levels "7.15656657704492",..: 4 27 5 146 31 132 36 129 17 388 ...
##  $ TrialNumber    : Factor w/ 240 levels "1","2","3","4",..: 1 2 3 4 8 9 10 11 12 14 ...
```

```r
sem <- df_factors %>%
  filter(Task == "PhysPsych") %>%
  mutate(
         Semantic = ifelse(grepl("physical", ConcValCombo), "physical",
                    ifelse(grepl("psychological", ConcValCombo), "psychological", NA)),
         Valence =  ifelse(grepl("positive", ConcValCombo), "positive",
                    ifelse(grepl("negative", ConcValCombo), "negative", NA)),
        cConcValCombo = as.numeric(ConcValCombo) - mean(as.numeric(ConcValCombo)),
        cSemantic = as.numeric(factor(Semantic)) - mean(as.numeric(factor(Semantic)))
  )

m = lmer(LogReactionTime ~ cConcValCombo + (1+cConcValCombo|ID.true) + (1+cConcValCombo|Word), data=sem)
summary(m)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: LogReactionTime ~ cConcValCombo + (1 + cConcValCombo | ID.true) +
##     (1 + cConcValCombo | Word)
##    Data: sem
##
## REML criterion at convergence: 2959.9
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.8888 -0.6566 -0.1945  0.5170  4.0708
##
## Random effects:
##  Groups   Name          Variance Std.Dev. Corr
##  Word     (Intercept)   0.001486 0.03854
##           cConcValCombo 0.003386 0.05819  -0.82
```

```
##  ID.true  (Intercept)   0.044428 0.21078
##           cConcValCombo 0.001818 0.04263  0.21
##  Residual               0.111663 0.33416
## Number of obs: 4183, groups:  Word, 40; ID.true, 39
##
## Fixed effects:
##                Estimate Std. Error        df t value Pr(>|t|)
## (Intercept)    6.819900   0.035384 43.067609 192.741   <2e-16 ***
## cConcValCombo  0.001652   0.014185 29.870252   0.116    0.908
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr)
## cConcValCmb -0.028
```

```r
m = lmer(LogReactionTime ~ cSemantic + (1+cSemantic|ID.true) + (1|Word), data=sem)
summary(m)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: LogReactionTime ~ cSemantic + (1 + cSemantic | ID.true) + (1 |
##     Word)
##    Data: sem
##
## REML criterion at convergence: 2935.6
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.8953 -0.6535 -0.1925  0.5069  4.1631
##
## Random effects:
##  Groups   Name        Variance Std.Dev. Corr
##  Word     (Intercept) 0.004317 0.0657
##  ID.true  (Intercept) 0.044194 0.2102
##           cSemantic   0.013265 0.1152   0.28
##  Residual             0.110707 0.3327
## Number of obs: 4183, groups:  Word, 40; ID.true, 39
##
## Fixed effects:
##             Estimate Std. Error       df t value Pr(>|t|)
## (Intercept)  6.83325    0.03562 44.72305 191.860   <2e-16 ***
## cSemantic   -0.01279    0.02967 57.15876  -0.431    0.668
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##           (Intr)
## cSemantic 0.174
```

In the Valence task , is there a difference between positive and negative on ReactionTime?

- Nope.

```r
val <- df_factors %>%
  filter(Task == "Valence") %>%
  mutate(
         Semantic = ifelse(grepl("physical", ConcValCombo), "physical",
                    ifelse(grepl("psychological", ConcValCombo), "psychological", NA)),
         Valence = ifelse(grepl("positive", ConcValCombo), "positive",
                    ifelse(grepl("negative", ConcValCombo), "negative", NA)),
         cConcValCombo = as.numeric(ConcValCombo) - mean(as.numeric(ConcValCombo)),
         cValence = as.numeric(factor(Valence)) - mean(as.numeric(factor(Valence)))
         )

m = lmer(LogReactionTime ~ cConcValCombo + (1+cConcValCombo|ID.true) + (1+cConcValCombo|Word), data=val)
```

```
## boundary (singular) fit: see help('isSingular')
```

```r
summary(m)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: LogReactionTime ~ cConcValCombo + (1 + cConcValCombo | ID.true) +
##     (1 + cConcValCombo | Word)
##    Data: val
##
## REML criterion at convergence: 1709.9
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.3886 -0.6105 -0.1528  0.4113  5.5495
##
## Random effects:
##  Groups   Name          Variance  Std.Dev. Corr
##  Word     (Intercept)   3.817e-03 0.061780
##           cConcValCombo 1.014e-05 0.003184 -1.00
##  ID.true  (Intercept)   3.549e-02 0.188383
##           cConcValCombo 5.115e-04 0.022616 -0.06
##  Residual               8.111e-02 0.284802
## Number of obs: 4450, groups:  Word, 40; ID.true, 39
##
## Fixed effects:
##               Estimate Std. Error       df t value Pr(>|t|)
## (Intercept)    6.65554    0.03200 45.53079 207.987   <2e-16 ***
## cConcValCombo -0.01311    0.01020 44.86300  -1.286    0.205
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr)
## cConcValCmb -0.048
## optimizer (nloptwrap) convergence code: 0 (OK)
## boundary (singular) fit: see help('isSingular')
```

```r
m = lmer(LogReactionTime ~ cValence + (1+cValence|ID.true) + (1|Word), data=val)
summary(m)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
```

```
## lmerModLmerTest]
## Formula: LogReactionTime ~ cValence + (1 + cValence | ID.true) + (1 |
##     Word)
##    Data: val
##
## REML criterion at convergence: 1700.4
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.3932 -0.6162 -0.1568  0.4152  5.6339
##
## Random effects:
##  Groups   Name        Variance Std.Dev. Corr
##  Word     (Intercept) 0.003960 0.06293
##  ID.true  (Intercept) 0.035522 0.18847
##           cValence    0.003796 0.06161  -0.15
##  Residual             0.080805 0.28426
## Number of obs: 4450, groups:  Word, 40; ID.true, 39
##
## Fixed effects:
##             Estimate Std. Error       df t value Pr(>|t|)
## (Intercept)  6.65580    0.03206 45.78464 207.574   <2e-16 ***
## cValence    -0.01504    0.02380 48.40832  -0.632     0.53
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##          (Intr)
## cValence -0.058
```