concordance=TRUE

Effects on projectivity ratings by Embedding Operator and Trigger — Data Analysis

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December 5, 2022

Contents

1 Introducing the dataset

```
> str(data)

'data.frame': 57160 obs. of  9 variables:
 $ workerid     : int  1 1 1 1 1 1 1 1 1 1 ...
 $ content      : chr  "charley" "danny" "emily" "emma" ...
 $ short_trigger: chr  "acknowledge" "hear" "reveal" "discover" ...
 $ ai_block     : chr  "block1" "block1" "block1" "block1" ...
 $ ai           : num  0.98 0.99 0.99 0.99 0.98 0.98 1 0.99 0.99 0.99 ...
 $ projective   : num  0.3 0.98 0.01 0.99 0.98 0.99 0.01 0.01 0.27 0.01 ...
 $ verb         : chr  "acknowledge" "hear" "reveal" "discover" ...
 $ op           : chr  "q" "q" "q" "q" ...
 $ exp_block    : int  1 1 1 1 1 1 1 1 1 1 ...

> data$workerid <- as.factor(data$workerid)
> length(levels(data$workerid))

[1] 2682
```

The dataset consists of 57160 observations from 2682 participants (recruited on the online platforms Prolific and Amazon Mechanical Turk), across 12 experiments.

We are interested in how highly participants rate speaker commitment to the truth of an embedded complement clause, coded as `projective` on a real-numbered sliding scale between $0 - 1$.

The complement clause was embedded under an attitude verb, which in turn was embedded under an entailment-cancelling operator. Our fixed effects factors manipulate the following:

1. The choice of attitude verb (coded as `verb`)
2. The entailment-cancelling operator (coded as `op`)

The levels for our fixed effects factors are the following:

```
> data$verb <- as.factor(data$verb)
> levels(data$verb)

 [1] "acknowledge" "admit"       "announce"    "be_annoyed"  "be_right"
 [6] "confess"     "confirm"     "demonstrate" "discover"    "establish"
[11] "hear"        "inform"      "know"        "pretend"     "prove"
[16] "reveal"      "say"         "see"         "suggest"     "think"

> length(levels(data$verb))

[1] 20

> data$op <- as.factor(data$op)
> levels(data$op)

[1] "c" "m" "n" "q"

> length(levels(data$op))

[1] 4
```

We are interested in the effect on `projective` of `verb` and `op`, as well as their interaction, corresponding to a 20×4 factorial design, yielding

```
> length(levels(data$verb))*length(levels(data$op))

[1] 80
```

conditions.

We have 20 items, corresponding to the content of the complement clause.

```
> data$content <- as.factor(data$content)
> levels(data$content)

 [1] "charley"  "danny"    "emily"    "emma"     "frank"    "grace"
 [7] "isabella" "jackson"  "jayden"   "jon"      "josh"     "josie"
[13] "julian"   "mary"     "mia"      "olivia"   "owen"     "sophia"
[19] "tony"     "zoe"

> length(levels(data$content))

[1] 20
```

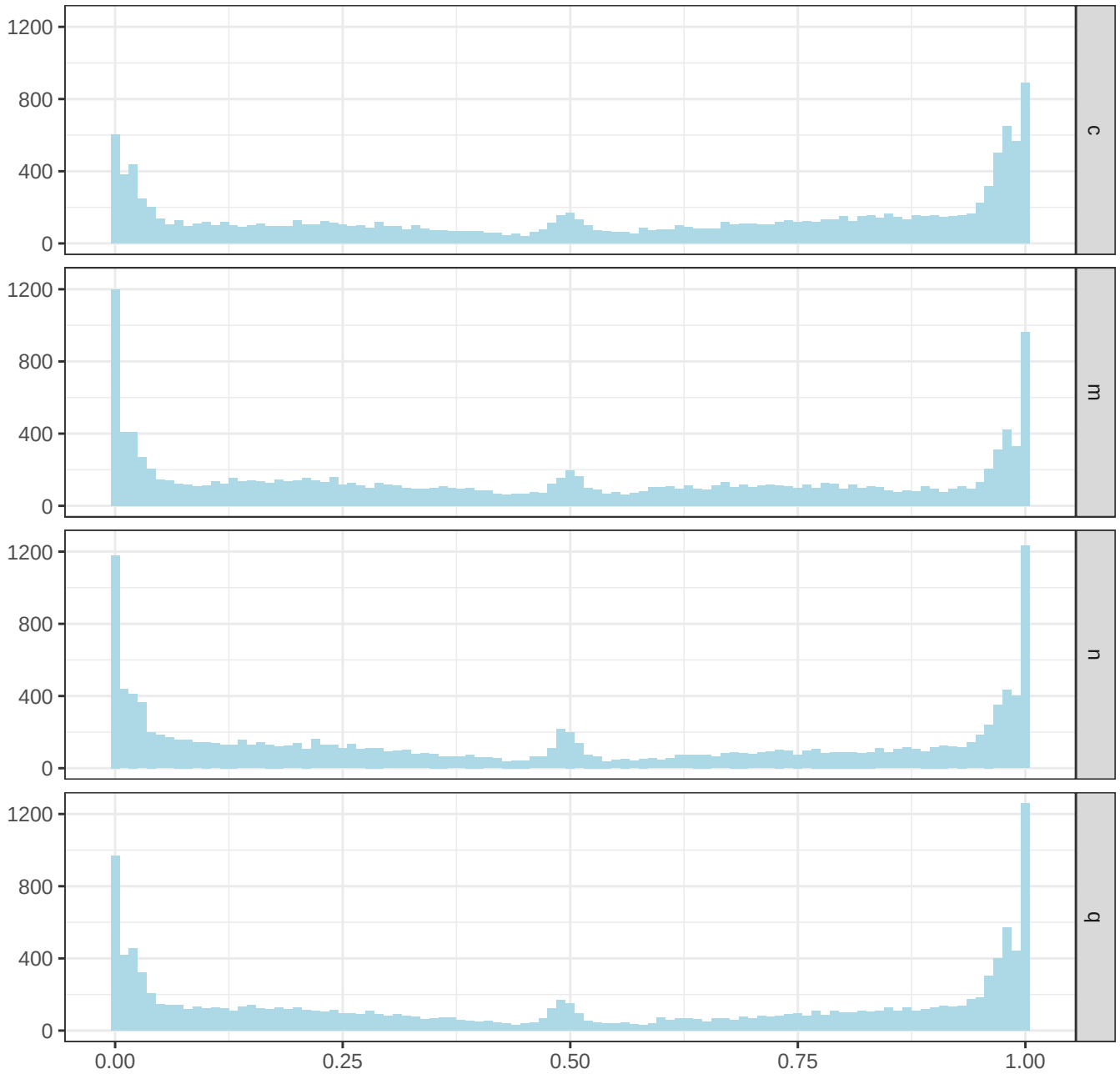
We have roughly 36 observations by item and condition. This is an approximate number, because the `op` manipulation is a between-studies manipulation, and the number of participants differs by experiment:

```
> # n observations
> length(data[,1])

[1] 57160

> # observations by item
> length(data[,1])/length(levels(data$content))

[1] 2858
```

```
> table(data$content)


 charley    danny    emily     emma    frank    grace isabella  jackson
    2858     2858     2858     2858     2858     2858     2858     2858
  jayden      jon     josh    josie   julian     mary      mia   olivia
    2858     2858     2858     2858     2858     2858     2858     2858
    owen   sophia     tony      zoe
    2858     2858     2858     2858

> # observations by verb
> length(data[,1])/length(levels(data$verb))

[1] 2858

> table(data$verb)


acknowledge       admit    announce  be_annoyed    be_right     confess
       2858        2858        2858        2858        2858        2858
    confirm demonstrate    discover   establish        hear      inform
       2858        2858        2858        2858        2858        2858
       know     pretend       prove      reveal         say         see
       2858        2858        2858        2858        2858        2858
    suggest       think
       2858        2858

> # observations by operator
> length(data[,1])/length(levels(data$op))

[1] 14290

> table(data$op)


    c     m     n     q
14400 14680 14340 13740

> # observations by item and condition
> length(data[,1])/length(levels(data$content))/
+   (length(levels(data$verb))*length(levels(data$op)))

[1] 35.725
```

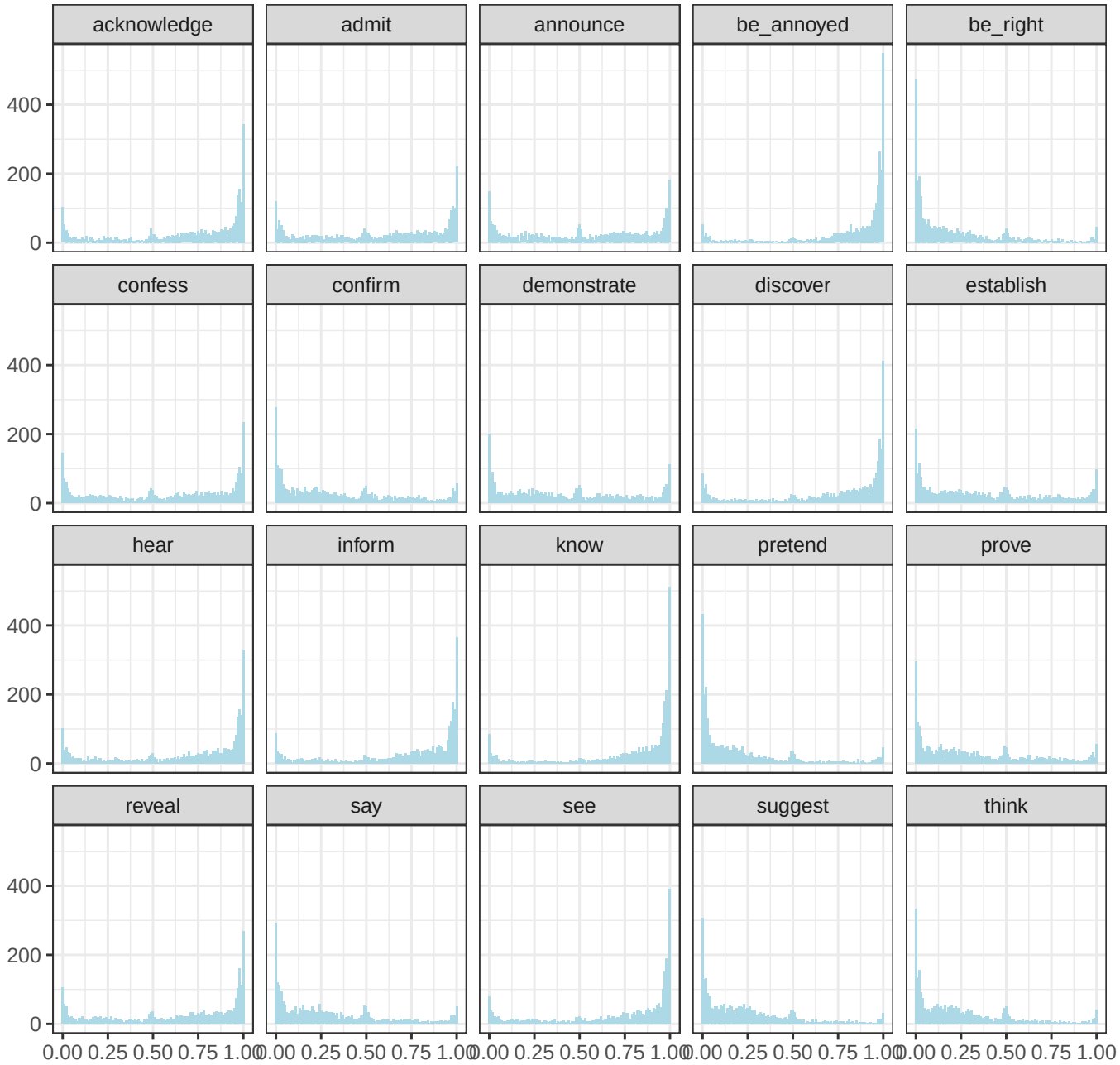
2 Data Overview and Statistical Summaries

2.1 Distribution of projectivity ratings by operator:



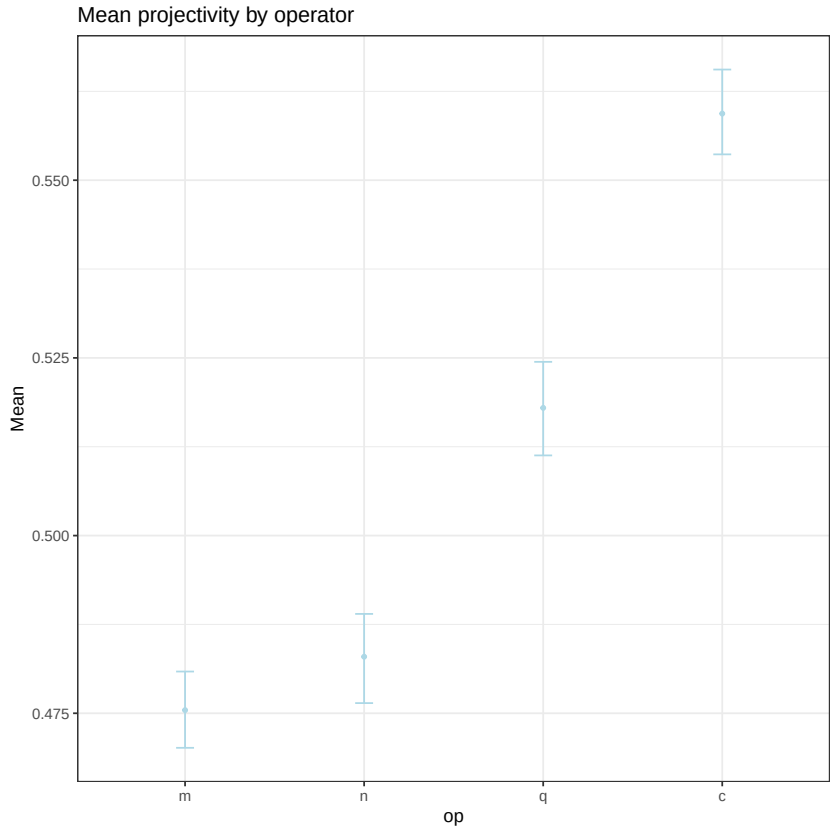
- These definitely do not look normal
- Maybe a beta-regression would be useful?
- But even that would be relying on some simplifying assumptions, since we might be ignoring the little bump in the middle

2.2 Distribution of projectivity ratings by verb:



- Some of these also show a higher mass around the middle of the scale
- but it looks the beta-distribution could be useful

2.3 Means and confidence intervals for projectivity rating by operator



The following generalizations emerge:

- Conditionals have the highest projectivity ratings
- Projectivity ratings for questions are higher than those for modals and negation, but lower than those for conditionals
- Modals and negation have the lowest projectivity ratings
- The ratings for negation look a little higher than for modals, but error bars overlap

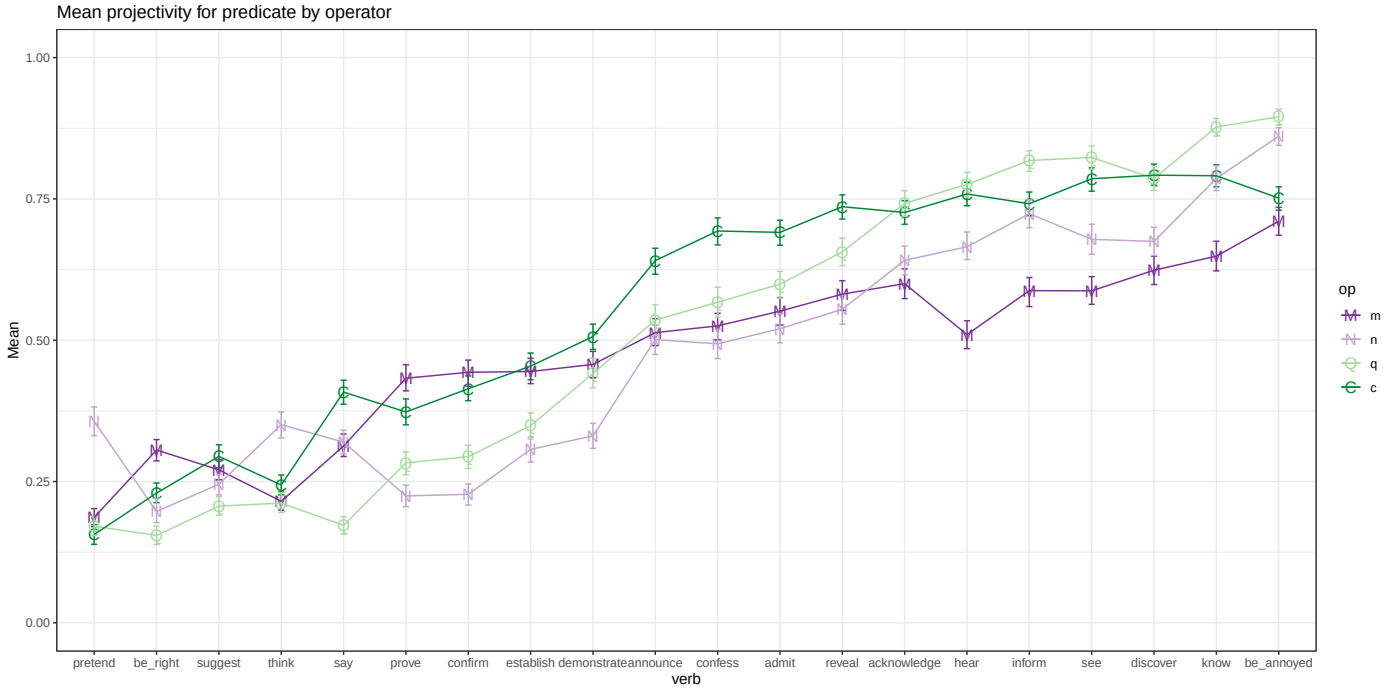
Although these differences appear to be significant, they are quite small.

2.4 Means and confidence intervals for projectivity rating by verb:

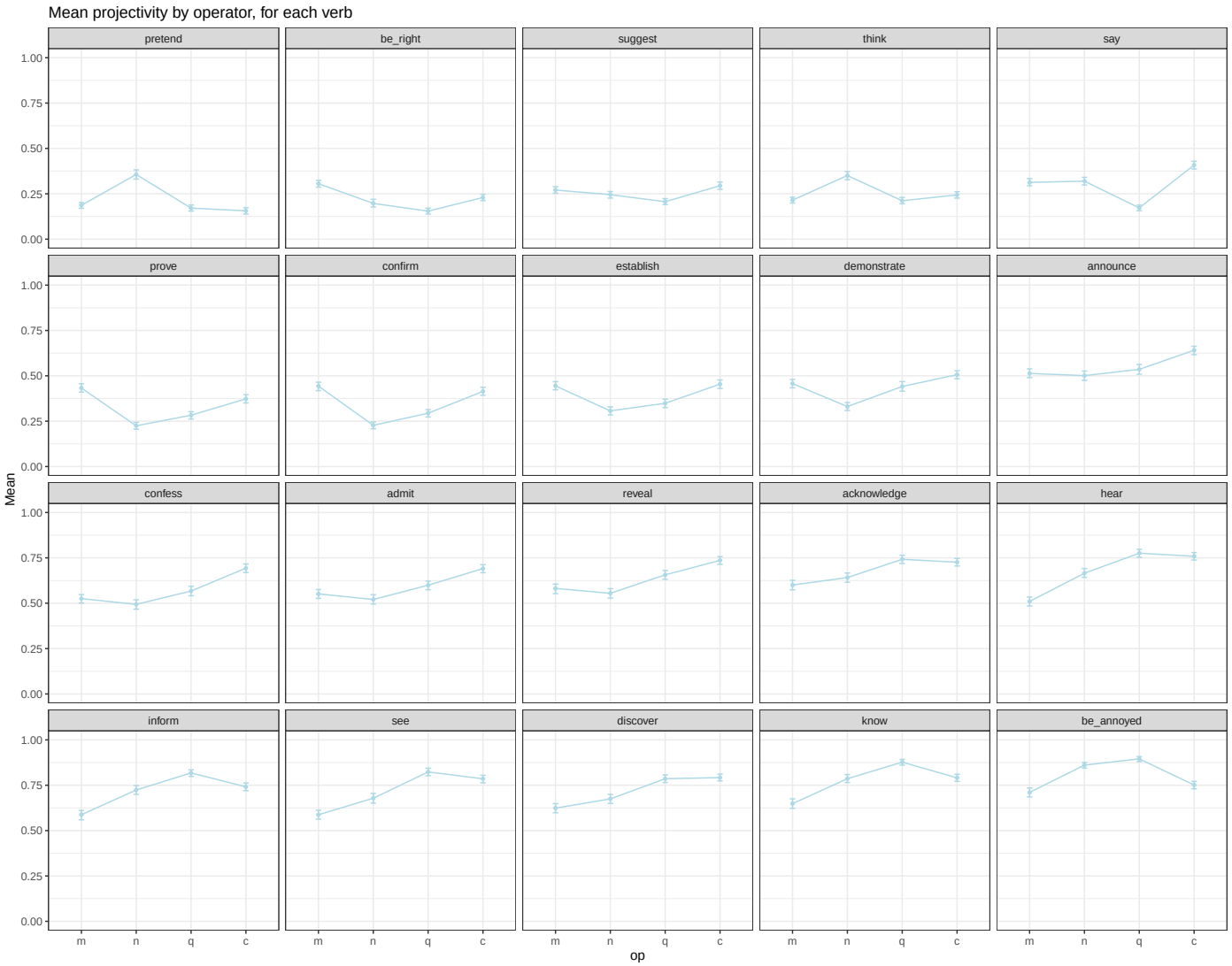
This will be replaced by violin-plot.

- We see gradual differences in projectivity between verbs

2.5 Means and confidence intervals for projectivity rating by verb and operator:



- We see interactions between verb and operator
- Two verbs show highest projectivity under negation: the anti-veridical *pretend*, and the non-veridical *think*. These are verb with relatively low overall projectivity.
- More projective verbs (*'announce'* and above) have `C` > `M`
- Highly projective verbs (*'hear '* and above) have `N` > `M`
- We do not see any group of verbs that could be characterized as 'semi-factive' in the sense of Karttunen.
  - Specifically, *discover* does not follow the predicted pattern: It is not more projective under negation, but most projective in conditionals and questions.
  - For Karttunnen's 'factives', no difference between operators is expected.
  - Kajsa Djärv about this distinction: cognitive predicates are semi-factive, and emotives are factive. The pattern suggested by karrtunen is also not found here (if anything, it might be the other way round)
- For more generalizations, let's look at the same information plotted differently: By-operator projectivity for each verb



Some more generalizations: We find different 'profiles' for different verbs, of how embedding operators affect projectivity based on the verb. Groups of verbs show similar profiles:

- *pretend, think*: **anti-veridical profile**
  `N` $>$ `M, Q, C`, overall low projectivity
- *acknowledge, hear, inform, see, discover, know, be annoyed*: **'factive' profile**
  `Q` $>$ `N, C` $>_?$ `M`, overall high projectivity (it may be possible to find further subgroups here)
- *prove, confirm, establish, demonstrate, (announce), confess, admit, reveal*: **veridical profile**
  `M, C` $>$ `Q` $>$ `N`, overall med-lo to med-hi projectivity
- *be right, suggest*: **reportative profile**
  `M, N, C` $>$ `Q`

Maybe these can have better names, not trying to suggest that verbs can neatly divided in factive v non-factive, but potentially this class / profile is what prompted intuitions in previous literature, and naming in this tradition could make sense, but can be changed depending on our rhetoric, of course.

3 Analysis

We are interested in how the response (projectivity ratings) depends on the verb and embedding operator, and whether the above generalizations can be supported statistically.

Exploring a couple of models

3.1 Linear frequentist with `suggest/m` as baseline

```
> # our independent variables
> ## inference-triggering predicate, coded as "verb"
> data$verb <- as.factor(data$verb)
> levels(data$verb)

 [1] "acknowledge" "admit"       "announce"    "be_annoyed"  "be_right"
 [6] "confess"     "confirm"     "demonstrate" "discover"    "establish"
[11] "hear"        "inform"      "know"        "pretend"     "prove"
[16] "reveal"      "say"         "see"         "suggest"     "think"

> # contrasts(data$verb)
> ### dummy coding with "suggest" as baseline
> data$verb <- relevel(data$verb, ref = "suggest")
> # contrasts(data$verb)
>
> ## embedding operator, coded as "op"
> data$op <- as.factor(data$op)
> levels(data$op)

[1] "c" "m" "n" "q"

> # contrasts(data$op)
> ### dummy coding with "m" as baseline
> data$op <- relevel(data$op, ref = "m")
> # contrasts(data$op)
>
> # coding random effects as factors
> data$workerid <- as.factor(data$workerid)
> data$content <- as.factor(data$content)
>
> library(lme4)
> library(lmerTest)
>
> # glmm1 <- lmer(projective ~ verb * op + (1 | workerid) +
> #                 (1 | content), data=data)
>
> # save.image("../../../results/main/meta-analyses/projectivity/rscripts/linear-models.RData")
> load("../../../results/main/meta-analyses/projectivity/rscripts/linear-models.RData")
> print(summary(glmm1), cor=F, dig=3)

Linear mixed model fit by REML. t-tests use Satterthwaite's method [
lmerModLmerTest]
Formula: projective ~ verb * op + (1 | workerid) + (1 | content)
   Data: data

REML criterion at convergence: 12825.3

Scaled residuals:
   Min     1Q Median     3Q    Max
-4.034 -0.653  0.039  0.659  4.254

Random effects:
 Groups   Name        Variance Std.Dev.
 workerid (Intercept) 0.026816 0.1638
 content  (Intercept) 0.000269 0.0164
 Residual             0.065256 0.2555
Number of obs: 57160, groups:  workerid, 2682; content, 20
```

```
Fixed effects:
                     Estimate Std. Error         df t value Pr(>|t|)
(Intercept)          2.71e-01   1.18e-02  1.62e+03   22.99  < 2e-16 ***
verbbe_annoyed       4.40e-01   1.33e-02  5.44e+04   32.97  < 2e-16 ***
verbacknowledge      3.29e-01   1.33e-02  5.44e+04   24.69  < 2e-16 ***
verbadmit            2.80e-01   1.33e-02  5.44e+04   21.03  < 2e-16 ***
verbannounce         2.42e-01   1.33e-02  5.44e+04   18.16  < 2e-16 ***
verbbe_right         3.40e-02   1.33e-02  5.44e+04    2.55  0.01078 *
verbconfess          2.55e-01   1.33e-02  5.44e+04   19.13  < 2e-16 ***
verbconfirm          1.72e-01   1.33e-02  5.44e+04   12.91  < 2e-16 ***
verbdemonstrate      1.87e-01   1.33e-02  5.44e+04   14.05  < 2e-16 ***
verbdiscover         3.53e-01   1.33e-02  5.44e+04   26.50  < 2e-16 ***
verbestablish        1.73e-01   1.33e-02  5.44e+04   13.00  < 2e-16 ***
verbhear             2.39e-01   1.33e-02  5.44e+04   17.95  < 2e-16 ***
verbinform           3.16e-01   1.33e-02  5.44e+04   23.72  < 2e-16 ***
verbknow             3.78e-01   1.33e-02  5.44e+04   28.32  < 2e-16 ***
verbpretend         -8.47e-02   1.33e-02  5.44e+04   -6.35  2.1e-10 ***
verbprove            1.61e-01   1.33e-02  5.44e+04   12.09  < 2e-16 ***
verbreveal           3.11e-01   1.33e-02  5.44e+04   23.29  < 2e-16 ***
verbsay              4.29e-02   1.33e-02  5.44e+04    3.22  0.00130 **
verbsee              3.16e-01   1.33e-02  5.44e+04   23.72  < 2e-16 ***
verbthink           -5.59e-02   1.33e-02  5.44e+04   -4.19  2.8e-05 ***
opq                 -6.90e-02   1.57e-02  2.68e+04   -4.39  1.1e-05 ***
opc                  2.37e-02   1.59e-02  2.08e+04    1.49  0.13679
opn                 -2.02e-02   1.56e-02  2.63e+04   -1.29  0.19575
verbbe_annoyed:opq   2.50e-01   1.92e-02  5.44e+04   13.05  < 2e-16 ***
verbacknowledge:opq  2.08e-01   1.92e-02  5.44e+04   10.82  < 2e-16 ***
verbadmit:opq        1.13e-01   1.92e-02  5.44e+04    5.91  3.5e-09 ***
verbannounce:opq     8.88e-02   1.92e-02  5.44e+04    4.63  3.6e-06 ***
verbbe_right:opq    -8.55e-02   1.92e-02  5.44e+04   -4.46  8.2e-06 ***
verbconfess:opq      1.06e-01   1.92e-02  5.44e+04    5.53  3.3e-08 ***
verbconfirm:opq     -8.47e-02   1.92e-02  5.44e+04   -4.41  1.0e-05 ***
verbdemonstrate:opq  4.74e-02   1.92e-02  5.44e+04    2.47  0.01357 *
verbdiscover:opq     2.26e-01   1.92e-02  5.44e+04   11.80  < 2e-16 ***
verbestablish:opq   -3.14e-02   1.92e-02  5.44e+04   -1.64  0.10139
verbhear:opq         3.31e-01   1.92e-02  5.44e+04   17.24  < 2e-16 ***
verbinform:opq       2.95e-01   1.92e-02  5.44e+04   15.38  < 2e-16 ***
verbknow:opq         2.94e-01   1.92e-02  5.44e+04   15.34  < 2e-16 ***
verbpretend:opq      5.01e-02   1.92e-02  5.44e+04    2.61  0.00899 **
verbprove:opq       -8.46e-02   1.92e-02  5.44e+04   -4.41  1.0e-05 ***
verbreveal:opq       1.40e-01   1.92e-02  5.44e+04    7.31  2.7e-13 ***
verbsay:opq         -7.64e-02   1.92e-02  5.44e+04   -3.98  6.8e-05 ***
verbsee:opq          3.02e-01   1.92e-02  5.44e+04   15.73  < 2e-16 ***
verbthink:opq        6.20e-02   1.92e-02  5.44e+04    3.23  0.00123 **
verbbe_annoyed:opc   1.72e-02   1.90e-02  5.44e+04    0.91  0.36469
verbacknowledge:opc  1.02e-01   1.90e-02  5.44e+04    5.37  8.1e-08 ***
verbadmit:opc        1.16e-01   1.90e-02  5.44e+04    6.14  8.1e-10 ***
verbannounce:opc     1.04e-01   1.90e-02  5.44e+04    5.50  3.8e-08 ***
verbbe_right:opc    -9.86e-02   1.90e-02  5.44e+04   -5.20  2.0e-07 ***
verbconfess:opc      1.45e-01   1.90e-02  5.44e+04    7.63  2.4e-14 ***
verbconfirm:opc     -5.28e-02   1.90e-02  5.44e+04   -2.78  0.00536 **
verbdemonstrate:opc  2.42e-02   1.90e-02  5.44e+04    1.28  0.20104
verbdiscover:opc     1.44e-01   1.90e-02  5.44e+04    7.60  3.1e-14 ***
verbestablish:opc   -1.37e-02   1.90e-02  5.44e+04   -0.72  0.46985
verbhear:opc         2.23e-01   1.90e-02  5.44e+04   11.79  < 2e-16 ***
verbinform:opc       1.31e-01   1.90e-02  5.44e+04    6.91  5.0e-12 ***
verbknow:opc         1.18e-01   1.90e-02  5.44e+04    6.25  4.1e-10 ***
```

```
verbpretend:opc     -5.36e-02   1.90e-02  5.44e+04   -2.83  0.00468 **
verbprove:opc       -8.29e-02   1.90e-02  5.44e+04   -4.38  1.2e-05 ***
verbreveal:opc       1.31e-01   1.90e-02  5.44e+04    6.90  5.4e-12 ***
verbsay:opc          7.05e-02   1.90e-02  5.44e+04    3.72  0.00020 ***
verbsee:opc          1.75e-01   1.90e-02  5.44e+04    9.25  < 2e-16 ***
verbthink:opc        4.94e-03   1.90e-02  5.44e+04    0.26  0.79433
verbbe_annoyed:opn   1.77e-01   1.90e-02  5.44e+04    9.31  < 2e-16 ***
verbacknowledge:opn  6.66e-02   1.90e-02  5.44e+04    3.51  0.00045 ***
verbadmit:opn       -4.46e-03   1.90e-02  5.44e+04   -0.24  0.81416
verbannounce:opn     1.33e-02   1.90e-02  5.44e+04    0.70  0.48300
verbbe_right:opn    -8.16e-02   1.90e-02  5.44e+04   -4.30  1.7e-05 ***
verbconfess:opn     -7.10e-03   1.90e-02  5.44e+04   -0.37  0.70823
verbconfirm:opn     -1.90e-01   1.90e-02  5.44e+04  -10.00  < 2e-16 ***
verbdemonstrate:opn -1.02e-01   1.90e-02  5.44e+04   -5.36  8.2e-08 ***
verbdiscover:opn     7.64e-02   1.90e-02  5.44e+04    4.03  5.7e-05 ***
verbestablish:opn   -1.11e-01   1.90e-02  5.44e+04   -5.87  4.4e-09 ***
verbhear:opn         1.81e-01   1.90e-02  5.44e+04    9.55  < 2e-16 ***
verbinform:opn       1.62e-01   1.90e-02  5.44e+04    8.56  < 2e-16 ***
verbknow:opn         1.64e-01   1.90e-02  5.44e+04    8.62  < 2e-16 ***
verbpretend:opn      1.96e-01   1.90e-02  5.44e+04   10.33  < 2e-16 ***
verbprove:opn       -1.81e-01   1.90e-02  5.44e+04   -9.56  < 2e-16 ***
verbreveal:opn      -1.36e-04   1.90e-02  5.44e+04   -0.01  0.99427
verbsay:opn          3.14e-02   1.90e-02  5.44e+04    1.66  0.09775 .
verbsee:opn          1.17e-01   1.90e-02  5.44e+04    6.18  6.5e-10 ***
verbthink:opn        1.62e-01   1.90e-02  5.44e+04    8.54  < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

3.2 Linear frequentist with `annoyed/q` as baseline

```
> # dummy coding for "verb" with "suggest" as baseline
> data$verb <- relevel(data$verb, ref = "be_annoyed")
>
> ### dummy coding for "op" with "q" as baseline
> data$op <- relevel(data$op, ref = "q")
>
> # glmm2a <- lmer(projective ~ verb * op + (1 | workerid) +
> #                  (1 | content), data=data)
>
> # save.image("../../../results/main/meta-analyses/projectivity/rscripts/linear-models.RData")
> # load("../../../results/main/meta-analyses/projectivity/rscripts/linear-models.RData")
> print(summary(glmm2a), cor=F, dig=3)

Linear mixed model fit by REML. t-tests use Satterthwaite's method [
lmerModLmerTest]
Formula: projective ~ verb * op + (1 | workerid) + (1 | content)
   Data: data

REML criterion at convergence: 12825.3

Scaled residuals:
   Min     1Q Median     3Q    Max
-4.034 -0.653  0.039  0.659  4.254

Random effects:
 Groups   Name        Variance Std.Dev.
```

```
 workerid (Intercept) 0.026816 0.1638
 content  (Intercept) 0.000269 0.0164
 Residual             0.065256 0.2555
Number of obs: 57160, groups:  workerid, 2682; content, 20

Fixed effects:
                     Estimate Std. Error         df t value Pr(>|t|)
(Intercept)          8.92e-01   1.16e-02  1.58e+03   76.67  < 2e-16 ***
verbsuggest         -6.90e-01   1.38e-02  5.44e+04  -50.06  < 2e-16 ***
verbacknowledge     -1.53e-01   1.38e-02  5.44e+04  -11.11  < 2e-16 ***
verbadmit           -2.96e-01   1.38e-02  5.44e+04  -21.49  < 2e-16 ***
verbannounce        -3.59e-01   1.38e-02  5.44e+04  -26.04  < 2e-16 ***
verbbe_right        -7.42e-01   1.38e-02  5.44e+04  -53.80  < 2e-16 ***
verbconfess         -3.29e-01   1.38e-02  5.44e+04  -23.85  < 2e-16 ***
verbconfirm         -6.03e-01   1.38e-02  5.44e+04  -43.71  < 2e-16 ***
verbdemonstrate     -4.55e-01   1.38e-02  5.44e+04  -33.03  < 2e-16 ***
verbdiscover        -1.10e-01   1.38e-02  5.44e+04   -8.00  1.3e-15 ***
verbestablish       -5.48e-01   1.38e-02  5.44e+04  -39.76  < 2e-16 ***
verbhear            -1.20e-01   1.38e-02  5.44e+04   -8.71  < 2e-16 ***
verbinform          -7.87e-02   1.38e-02  5.44e+04   -5.71  1.2e-08 ***
verbknow            -1.79e-02   1.38e-02  5.44e+04   -1.30  0.19324
verbpretend         -7.25e-01   1.38e-02  5.44e+04  -52.57  < 2e-16 ***
verbprove           -6.13e-01   1.38e-02  5.44e+04  -44.50  < 2e-16 ***
verbreveal          -2.39e-01   1.38e-02  5.44e+04  -17.35  < 2e-16 ***
verbsay             -7.24e-01   1.38e-02  5.44e+04  -52.49  < 2e-16 ***
verbsee             -7.19e-02   1.38e-02  5.44e+04   -5.22  1.8e-07 ***
verbthink           -6.84e-01   1.38e-02  5.44e+04  -49.61  < 2e-16 ***
opm                 -1.81e-01   1.57e-02  2.68e+04  -11.53  < 2e-16 ***
opc                 -1.41e-01   1.58e-02  2.68e+04   -8.89  < 2e-16 ***
opn                 -2.49e-02   1.43e-02  5.68e+04   -1.74  0.08167 .
verbsuggest:opm      2.50e-01   1.92e-02  5.44e+04   13.05  < 2e-16 ***
verbacknowledge:opm  4.28e-02   1.92e-02  5.44e+04    2.23  0.02579 *
verbadmit:opm        1.37e-01   1.92e-02  5.44e+04    7.15  9.0e-13 ***
verbannounce:opm     1.62e-01   1.92e-02  5.44e+04    8.42  < 2e-16 ***
verbbe_right:opm     3.36e-01   1.92e-02  5.44e+04   17.51  < 2e-16 ***
verbconfess:opm      1.44e-01   1.92e-02  5.44e+04    7.53  5.3e-14 ***
verbconfirm:opm      3.35e-01   1.92e-02  5.44e+04   17.47  < 2e-16 ***
verbdemonstrate:opm  2.03e-01   1.92e-02  5.44e+04   10.59  < 2e-16 ***
verbdiscover:opm     2.40e-02   1.92e-02  5.44e+04    1.25  0.21058
verbestablish:opm    2.82e-01   1.92e-02  5.44e+04   14.69  < 2e-16 ***
verbhear:opm        -8.02e-02   1.92e-02  5.44e+04   -4.18  2.9e-05 ***
verbinform:opm      -4.46e-02   1.92e-02  5.44e+04   -2.33  0.02005 *
verbknow:opm        -4.40e-02   1.92e-02  5.44e+04   -2.29  0.02193 *
verbpretend:opm      2.00e-01   1.92e-02  5.44e+04   10.44  < 2e-16 ***
verbprove:opm        3.35e-01   1.92e-02  5.44e+04   17.46  < 2e-16 ***
verbreveal:opm       1.10e-01   1.92e-02  5.44e+04    5.74  9.3e-09 ***
verbsay:opm          3.27e-01   1.92e-02  5.44e+04   17.04  < 2e-16 ***
verbsee:opm         -5.14e-02   1.92e-02  5.44e+04   -2.68  0.00735 **
verbthink:opm        1.88e-01   1.92e-02  5.44e+04    9.82  < 2e-16 ***
verbsuggest:opc      2.33e-01   1.93e-02  5.44e+04   12.10  < 2e-16 ***
verbacknowledge:opc  1.27e-01   1.93e-02  5.44e+04    6.60  4.0e-11 ***
verbadmit:opc        2.36e-01   1.93e-02  5.44e+04   12.26  < 2e-16 ***
verbannounce:opc     2.49e-01   1.93e-02  5.44e+04   12.90  < 2e-16 ***
verbbe_right:opc     2.20e-01   1.93e-02  5.44e+04   11.42  < 2e-16 ***
verbconfess:opc      2.72e-01   1.93e-02  5.44e+04   14.10  < 2e-16 ***
verbconfirm:opc      2.65e-01   1.93e-02  5.44e+04   13.76  < 2e-16 ***
verbdemonstrate:opc  2.10e-01   1.93e-02  5.44e+04   10.90  < 2e-16 ***
verbdiscover:opc     1.51e-01   1.93e-02  5.44e+04    7.82  5.2e-15 ***
```

```
verbestablish:opc    2.51e-01   1.93e-02  5.44e+04   13.02  < 2e-16 ***
verbhear:opc         1.26e-01   1.93e-02  5.44e+04    6.54  6.2e-11 ***
verbinform:opc       6.91e-02   1.93e-02  5.44e+04    3.59  0.00034 ***
verbknow:opc         5.73e-02   1.93e-02  5.44e+04    2.97  0.00294 **
verbpretend:opc      1.29e-01   1.93e-02  5.44e+04    6.72  1.9e-11 ***
verbprove:opc        2.35e-01   1.93e-02  5.44e+04   12.19  < 2e-16 ***
verbreveal:opc       2.24e-01   1.93e-02  5.44e+04   11.61  < 2e-16 ***
verbsay:opc          3.80e-01   1.93e-02  5.44e+04   19.72  < 2e-16 ***
verbsee:opc          1.07e-01   1.93e-02  5.44e+04    5.54  3.1e-08 ***
verbthink:opc        1.76e-01   1.93e-02  5.44e+04    9.14  < 2e-16 ***
verbsuggest:opn      7.38e-02   1.93e-02  5.44e+04    3.82  0.00013 ***
verbacknowledge:opn -6.73e-02   1.93e-02  5.44e+04   -3.49  0.00049 ***
verbadmit:opn       -4.40e-02   1.93e-02  5.44e+04   -2.28  0.02254 *
verbannounce:opn    -1.75e-03   1.93e-02  5.44e+04   -0.09  0.92758
verbbe_right:opn     7.77e-02   1.93e-02  5.44e+04    4.03  5.7e-05 ***
verbconfess:opn     -3.94e-02   1.93e-02  5.44e+04   -2.04  0.04128 *
verbconfirm:opn     -3.13e-02   1.93e-02  5.44e+04   -1.62  0.10483
verbdemonstrate:opn -7.54e-02   1.93e-02  5.44e+04   -3.91  9.4e-05 ***
verbdiscover:opn    -7.62e-02   1.93e-02  5.44e+04   -3.95  7.8e-05 ***
verbestablish:opn   -6.16e-03   1.93e-02  5.44e+04   -0.32  0.74945
verbhear:opn        -7.56e-02   1.93e-02  5.44e+04   -3.92  8.9e-05 ***
verbinform:opn      -5.88e-02   1.93e-02  5.44e+04   -3.05  0.00232 **
verbknow:opn        -5.70e-02   1.93e-02  5.44e+04   -2.95  0.00315 **
verbpretend:opn      2.20e-01   1.93e-02  5.44e+04   11.39  < 2e-16 ***
verbprove:opn       -2.31e-02   1.93e-02  5.44e+04   -1.20  0.23153
verbreveal:opn      -6.66e-02   1.93e-02  5.44e+04   -3.45  0.00056 ***
verbsay:opn          1.82e-01   1.93e-02  5.44e+04    9.41  < 2e-16 ***
verbsee:opn         -1.11e-01   1.93e-02  5.44e+04   -5.75  9.2e-09 ***
verbthink:opn        1.74e-01   1.93e-02  5.44e+04    9.01  < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

«««< HEAD =======

3.3 Linear frequentist with `prove/n` as baseline

```
> # dummy coding for "verb" with "prove" as baseline
> data$verb <- relevel(data$verb, ref = "prove")
>
> ### dummy coding for "op" with "n" as baseline
> data$op <- relevel(data$op, ref = "n")
>
> # glmm3 <- lmer(projective ~ verb * op + (1 | workerid) +
> #                 (1 | content), data=data)
> #
> # save.image("../../../results/main/meta-analyses/projectivity/rscripts/linear-models.RData")
> load("../../../results/main/meta-analyses/projectivity/rscripts/linear-models.RData")
> print(summary(glmm3), cor=F, dig=3)

Linear mixed model fit by REML. t-tests use Satterthwaite's method [
lmerModLmerTest]
Formula: projective ~ verb * op + (1 | workerid) + (1 | content)
   Data: data

REML criterion at convergence: 12825.3

Scaled residuals:
```

```
   Min     1Q Median     3Q    Max
-4.034 -0.653  0.039  0.659  4.254

Random effects:
 Groups   Name        Variance Std.Dev.
 workerid (Intercept) 0.026816 0.1638
 content  (Intercept) 0.000269 0.0164
 Residual             0.065256 0.2555
Number of obs: 57160, groups:  workerid, 2682; content, 20

Fixed effects:
                     Estimate Std. Error        df t value Pr(>|t|)
(Intercept)          2.31e-01   1.14e-02  1.48e+03   20.15  < 2e-16 ***
verbbe_annoyed       6.36e-01   1.35e-02  5.44e+04   47.17  < 2e-16 ***
verbsuggest          2.02e-02   1.35e-02  5.44e+04    1.50  0.13388
verbacknowledge      4.16e-01   1.35e-02  5.44e+04   30.83  < 2e-16 ***
verbadmit            2.96e-01   1.35e-02  5.44e+04   21.96  < 2e-16 ***
verbannounce         2.76e-01   1.35e-02  5.44e+04   20.44  < 2e-16 ***
verbbe_right        -2.74e-02   1.35e-02  5.44e+04   -2.03  0.04231 *
verbconfess          2.68e-01   1.35e-02  5.44e+04   19.88  < 2e-16 ***
verbconfirm          2.66e-03   1.35e-02  5.44e+04    0.20  0.84380
verbdemonstrate      1.06e-01   1.35e-02  5.44e+04    7.84  4.6e-15 ***
verbdiscover         4.50e-01   1.35e-02  5.44e+04   33.35  < 2e-16 ***
verbestablish        8.22e-02   1.35e-02  5.44e+04    6.10  1.1e-09 ***
verbhear             4.41e-01   1.35e-02  5.44e+04   32.67  < 2e-16 ***
verbinform           4.99e-01   1.35e-02  5.44e+04   36.98  < 2e-16 ***
verbknow             5.62e-01   1.35e-02  5.44e+04   41.62  < 2e-16 ***
verbpretend          1.32e-01   1.35e-02  5.44e+04    9.75  < 2e-16 ***
verbreveal           3.31e-01   1.35e-02  5.44e+04   24.51  < 2e-16 ***
verbsay              9.45e-02   1.35e-02  5.44e+04    7.01  2.5e-12 ***
verbsee              4.54e-01   1.35e-02  5.44e+04   33.63  < 2e-16 ***
verbthink            1.26e-01   1.35e-02  5.44e+04    9.37  < 2e-16 ***
opq                  4.80e-02   1.43e-02  5.68e+04    3.35  0.00080 ***
opm                  2.02e-01   1.56e-02  2.63e+04   12.94  < 2e-16 ***
opc                  1.42e-01   1.57e-02  2.62e+04    9.09  < 2e-16 ***
verbbe_annoyed:opq  -2.31e-02   1.93e-02  5.44e+04   -1.20  0.23153
verbsuggest:opq     -9.68e-02   1.93e-02  5.44e+04   -5.02  5.2e-07 ***
verbacknowledge:opq  4.42e-02   1.93e-02  5.44e+04    2.29  0.02193 *
verbadmit:opq        2.09e-02   1.93e-02  5.44e+04    1.08  0.27806
verbannounce:opq    -2.13e-02   1.93e-02  5.44e+04   -1.11  0.26894
verbbe_right:opq    -1.01e-01   1.93e-02  5.44e+04   -5.22  1.8e-07 ***
verbconfess:opq      1.63e-02   1.93e-02  5.44e+04    0.84  0.39861
verbconfirm:opq      8.21e-03   1.93e-02  5.44e+04    0.43  0.67055
verbdemonstrate:opq  5.23e-02   1.93e-02  5.44e+04    2.71  0.00674 **
verbdiscover:opq     5.31e-02   1.93e-02  5.44e+04    2.76  0.00587 **
verbestablish:opq   -1.69e-02   1.93e-02  5.44e+04   -0.88  0.38039
verbhear:opq         5.25e-02   1.93e-02  5.44e+04    2.72  0.00648 **
verbinform:opq       3.57e-02   1.93e-02  5.44e+04    1.85  0.06444 .
verbknow:opq         3.39e-02   1.93e-02  5.44e+04    1.76  0.07905 .
verbpretend:opq     -2.43e-01   1.93e-02  5.44e+04  -12.58  < 2e-16 ***
verbreveal:opq       4.35e-02   1.93e-02  5.44e+04    2.26  0.02411 *
verbsay:opq         -2.05e-01   1.93e-02  5.44e+04  -10.61  < 2e-16 ***
verbsee:opq          8.77e-02   1.93e-02  5.44e+04    4.55  5.4e-06 ***
verbthink:opq       -1.97e-01   1.93e-02  5.44e+04  -10.21  < 2e-16 ***
verbbe_annoyed:opm  -3.58e-01   1.90e-02  5.44e+04  -18.87  < 2e-16 ***
verbsuggest:opm     -1.81e-01   1.90e-02  5.44e+04   -9.56  < 2e-16 ***
verbacknowledge:opm -2.48e-01   1.90e-02  5.44e+04  -13.07  < 2e-16 ***
verbadmit:opm       -1.77e-01   1.90e-02  5.44e+04   -9.33  < 2e-16 ***
```

```
verbannounce:opm    -1.95e-01   1.90e-02  5.44e+04  -10.26  < 2e-16 ***
verbbe_right:opm    -9.98e-02   1.90e-02  5.44e+04   -5.26  1.4e-07 ***
verbconfess:opm     -1.74e-01   1.90e-02  5.44e+04   -9.19  < 2e-16 ***
verbconfirm:opm      8.28e-03   1.90e-02  5.44e+04    0.44  0.66249
verbdemonstrate:opm -7.97e-02   1.90e-02  5.44e+04   -4.20  2.7e-05 ***
verbdiscover:opm    -2.58e-01   1.90e-02  5.44e+04  -13.59  < 2e-16 ***
verbestablish:opm   -7.01e-02   1.90e-02  5.44e+04   -3.69  0.00022 ***
verbhear:opm        -3.63e-01   1.90e-02  5.44e+04  -19.12  < 2e-16 ***
verbinform:opm      -3.44e-01   1.90e-02  5.44e+04  -18.13  < 2e-16 ***
verbknow:opm        -3.45e-01   1.90e-02  5.44e+04  -18.19  < 2e-16 ***
verbpretend:opm     -3.77e-01   1.90e-02  5.44e+04  -19.90  < 2e-16 ***
verbreveal:opm      -1.81e-01   1.90e-02  5.44e+04   -9.56  < 2e-16 ***
verbsay:opm         -2.13e-01   1.90e-02  5.44e+04  -11.22  < 2e-16 ***
verbsee:opm         -2.99e-01   1.90e-02  5.44e+04  -15.74  < 2e-16 ***
verbthink:opm       -3.43e-01   1.90e-02  5.44e+04  -18.11  < 2e-16 ***
verbbe_annoyed:opc  -2.58e-01   1.91e-02  5.44e+04  -13.53  < 2e-16 ***
verbsuggest:opc     -9.85e-02   1.91e-02  5.44e+04   -5.17  2.4e-07 ***
verbacknowledge:opc -6.34e-02   1.91e-02  5.44e+04   -3.33  0.00088 ***
verbadmit:opc        2.24e-02   1.91e-02  5.44e+04    1.17  0.24044
verbannounce:opc    -7.57e-03   1.91e-02  5.44e+04   -0.40  0.69145
verbbe_right:opc    -1.16e-01   1.91e-02  5.44e+04   -6.06  1.4e-09 ***
verbconfess:opc      5.32e-02   1.91e-02  5.44e+04    2.79  0.00529 **
verbconfirm:opc      3.84e-02   1.91e-02  5.44e+04    2.02  0.04382 *
verbdemonstrate:opc  2.75e-02   1.91e-02  5.44e+04    1.44  0.14947
verbdiscover:opc    -3.09e-02   1.91e-02  5.44e+04   -1.62  0.10448
verbestablish:opc   -8.77e-04   1.91e-02  5.44e+04   -0.05  0.96331
verbhear:opc        -5.63e-02   1.91e-02  5.44e+04   -2.95  0.00313 **
verbinform:opc      -1.30e-01   1.91e-02  5.44e+04   -6.82  8.9e-12 ***
verbknow:opc        -1.44e-01   1.91e-02  5.44e+04   -7.54  4.9e-14 ***
verbpretend:opc     -3.48e-01   1.91e-02  5.44e+04  -18.26  < 2e-16 ***
verbreveal:opc       3.23e-02   1.91e-02  5.44e+04    1.69  0.09013 .
verbsay:opc         -5.94e-02   1.91e-02  5.44e+04   -3.12  0.00183 **
verbsee:opc         -4.04e-02   1.91e-02  5.44e+04   -2.12  0.03389 *
verbthink:opc       -2.56e-01   1.91e-02  5.44e+04  -13.41  < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

»»»»> 55a96bc (abstract and analysis updates)

3.4 Linear frequentist with `know/m` as baseline

```
> # dummy coding for "verb" with "prove" as baseline
> data$verb <- relevel(data$verb, ref = "know")
>
> ### dummy coding for "op" with "n" as baseline
> data$op <- relevel(data$op, ref = "m")
>
> # glmm4 <- lmer(projective ~ verb * op + (1 | workerid) +
> #                 (1 | content), data=data)
> #
> # save.image("../../../results/main/meta-analyses/projectivity/rscripts/linear-models.RData")
> # load("../../../results/main/meta-analyses/projectivity/rscripts/linear-models.RData")
> print(summary(glmm4), cor=F, dig=3)

Linear mixed model fit by REML. t-tests use Satterthwaite's method [
lmerModLmerTest]
Formula: projective ~ verb * op + (1 | workerid) + (1 | content)
```

```
   Data: data

REML criterion at convergence: 12825.3

Scaled residuals:
   Min     1Q Median     3Q    Max
-4.034 -0.653  0.039  0.659  4.254

Random effects:
 Groups   Name        Variance Std.Dev.
 workerid (Intercept) 0.026816 0.1638
 content  (Intercept) 0.000269 0.0164
 Residual             0.065256 0.2555
Number of obs: 57160, groups:  workerid, 2682; content, 20

Fixed effects:
                     Estimate Std. Error         df t value Pr(>|t|)
(Intercept)          6.49e-01   1.18e-02  1.62e+03   55.04  < 2e-16 ***
verbprove           -2.17e-01   1.33e-02  5.44e+04  -16.24  < 2e-16 ***
verbbe_annoyed       6.19e-02   1.33e-02  5.44e+04    4.64  3.5e-06 ***
verbsuggest         -3.78e-01   1.33e-02  5.44e+04  -28.32  < 2e-16 ***
verbacknowledge     -4.85e-02   1.33e-02  5.44e+04   -3.64  0.00028 ***
verbadmit           -9.73e-02   1.33e-02  5.44e+04   -7.29  3.1e-13 ***
verbannounce        -1.36e-01   1.33e-02  5.44e+04  -10.16  < 2e-16 ***
verbbe_right        -3.44e-01   1.33e-02  5.44e+04  -25.78  < 2e-16 ***
verbconfess         -1.23e-01   1.33e-02  5.44e+04   -9.19  < 2e-16 ***
verbconfirm         -2.06e-01   1.33e-02  5.44e+04  -15.42  < 2e-16 ***
verbdemonstrate     -1.90e-01   1.33e-02  5.44e+04  -14.28  < 2e-16 ***
verbdiscover        -2.43e-02   1.33e-02  5.44e+04   -1.82  0.06803 .
verbestablish       -2.04e-01   1.33e-02  5.44e+04  -15.33  < 2e-16 ***
verbhear            -1.38e-01   1.33e-02  5.44e+04  -10.38  < 2e-16 ***
verbinform          -6.14e-02   1.33e-02  5.44e+04   -4.60  4.2e-06 ***
verbpretend         -4.62e-01   1.33e-02  5.44e+04  -34.67  < 2e-16 ***
verbreveal          -6.71e-02   1.33e-02  5.44e+04   -5.03  4.8e-07 ***
verbsay             -3.35e-01   1.33e-02  5.44e+04  -25.11  < 2e-16 ***
verbsee             -6.14e-02   1.33e-02  5.44e+04   -4.61  4.1e-06 ***
verbthink           -4.34e-01   1.33e-02  5.44e+04  -32.52  < 2e-16 ***
opn                  1.43e-01   1.56e-02  2.63e+04    9.20  < 2e-16 ***
opq                  2.25e-01   1.57e-02  2.68e+04   14.32  < 2e-16 ***
opc                  1.42e-01   1.59e-02  2.08e+04    8.93  < 2e-16 ***
verbprove:opn       -3.45e-01   1.90e-02  5.44e+04  -18.19  < 2e-16 ***
verbbe_annoyed:opn   1.30e-02   1.90e-02  5.44e+04    0.69  0.49308
verbsuggest:opn     -1.64e-01   1.90e-02  5.44e+04   -8.62  < 2e-16 ***
verbacknowledge:opn -9.71e-02   1.90e-02  5.44e+04   -5.12  3.1e-07 ***
verbadmit:opn       -1.68e-01   1.90e-02  5.44e+04   -8.86  < 2e-16 ***
verbannounce:opn    -1.50e-01   1.90e-02  5.44e+04   -7.92  2.4e-15 ***
verbbe_right:opn    -2.45e-01   1.90e-02  5.44e+04  -12.93  < 2e-16 ***
verbconfess:opn     -1.71e-01   1.90e-02  5.44e+04   -9.00  < 2e-16 ***
verbconfirm:opn     -3.53e-01   1.90e-02  5.44e+04  -18.62  < 2e-16 ***
verbdemonstrate:opn -2.65e-01   1.90e-02  5.44e+04  -13.99  < 2e-16 ***
verbdiscover:opn    -8.72e-02   1.90e-02  5.44e+04   -4.60  4.3e-06 ***
verbestablish:opn   -2.75e-01   1.90e-02  5.44e+04  -14.49  < 2e-16 ***
verbhear:opn         1.76e-02   1.90e-02  5.44e+04    0.93  0.35260
verbinform:opn      -1.14e-03   1.90e-02  5.44e+04   -0.06  0.95186
verbpretend:opn      3.24e-02   1.90e-02  5.44e+04    1.71  0.08742 .
verbreveal:opn      -1.64e-01   1.90e-02  5.44e+04   -8.63  < 2e-16 ***
verbsay:opn         -1.32e-01   1.90e-02  5.44e+04   -6.97  3.3e-12 ***
verbsee:opn         -4.64e-02   1.90e-02  5.44e+04   -2.45  0.01445 *
```

```
verbthink:opn        -1.55e-03   1.90e-02  5.44e+04   -0.08  0.93470
verbprove:opq        -3.79e-01   1.92e-02  5.44e+04  -19.75  < 2e-16 ***
verbbe_annoyed:opq   -4.40e-02   1.92e-02  5.44e+04   -2.29  0.02193 *
verbsuggest:opq      -2.94e-01   1.92e-02  5.44e+04  -15.34  < 2e-16 ***
verbacknowledge:opq  -8.67e-02   1.92e-02  5.44e+04   -4.52  6.2e-06 ***
verbadmit:opq        -1.81e-01   1.92e-02  5.44e+04   -9.44  < 2e-16 ***
verbannounce:opq     -2.06e-01   1.92e-02  5.44e+04  -10.71  < 2e-16 ***
verbbe_right:opq     -3.80e-01   1.92e-02  5.44e+04  -19.80  < 2e-16 ***
verbconfess:opq      -1.88e-01   1.92e-02  5.44e+04   -9.82  < 2e-16 ***
verbconfirm:opq      -3.79e-01   1.92e-02  5.44e+04  -19.76  < 2e-16 ***
verbdemonstrate:opq  -2.47e-01   1.92e-02  5.44e+04  -12.88  < 2e-16 ***
verbdiscover:opq     -6.80e-02   1.92e-02  5.44e+04   -3.54  0.00040 ***
verbestablish:opq    -3.26e-01   1.92e-02  5.44e+04  -16.98  < 2e-16 ***
verbhear:opq          3.63e-02   1.92e-02  5.44e+04    1.89  0.05859 .
verbinform:opq        6.51e-04   1.92e-02  5.44e+04    0.03  0.97292
verbpretend:opq      -2.44e-01   1.92e-02  5.44e+04  -12.73  < 2e-16 ***
verbreveal:opq       -1.54e-01   1.92e-02  5.44e+04   -8.03  9.6e-16 ***
verbsay:opq          -3.71e-01   1.92e-02  5.44e+04  -19.33  < 2e-16 ***
verbsee:opq           7.46e-03   1.92e-02  5.44e+04    0.39  0.69729
verbthink:opq        -2.32e-01   1.92e-02  5.44e+04  -12.11  < 2e-16 ***
verbprove:opc        -2.01e-01   1.90e-02  5.44e+04  -10.63  < 2e-16 ***
verbbe_annoyed:opc   -1.01e-01   1.90e-02  5.44e+04   -5.34  9.1e-08 ***
verbsuggest:opc      -1.18e-01   1.90e-02  5.44e+04   -6.25  4.1e-10 ***
verbacknowledge:opc  -1.68e-02   1.90e-02  5.44e+04   -0.88  0.37636
verbadmit:opc        -2.00e-03   1.90e-02  5.44e+04   -0.11  0.91585
verbannounce:opc     -1.42e-02   1.90e-02  5.44e+04   -0.75  0.45443
verbbe_right:opc     -2.17e-01   1.90e-02  5.44e+04  -11.45  < 2e-16 ***
verbconfess:opc       2.61e-02   1.90e-02  5.44e+04    1.38  0.16773
verbconfirm:opc      -1.71e-01   1.90e-02  5.44e+04   -9.03  < 2e-16 ***
verbdemonstrate:opc  -9.42e-02   1.90e-02  5.44e+04   -4.97  6.7e-07 ***
verbdiscover:opc      2.55e-02   1.90e-02  5.44e+04    1.35  0.17843
verbestablish:opc    -1.32e-01   1.90e-02  5.44e+04   -6.97  3.1e-12 ***
verbhear:opc          1.05e-01   1.90e-02  5.44e+04    5.54  3.0e-08 ***
verbinform:opc        1.25e-02   1.90e-02  5.44e+04    0.66  0.51096
verbpretend:opc      -1.72e-01   1.90e-02  5.44e+04   -9.08  < 2e-16 ***
verbreveal:opc        1.23e-02   1.90e-02  5.44e+04    0.65  0.51800
verbsay:opc          -4.79e-02   1.90e-02  5.44e+04   -2.53  0.01144 *
verbsee:opc           5.68e-02   1.90e-02  5.44e+04    3.00  0.00271 **
verbthink:opc        -1.14e-01   1.90e-02  5.44e+04   -5.99  2.1e-09 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

3.5 Linear frequentist with annoyed/n as baseline

```
> # dummy coding for "verb" with "suggest" as baseline
> data$verb <- relevel(data$verb, ref = "be_annoyed")
>
> ### dummy coding for "op" with "n" as baseline
> data$op <- relevel(data$op, ref = "n")
>
> # glmm6 <- lmer(projective ~ op * verb + (1 | workerid) +
> #                 (1 | content), data=data)
>
> # save.image("../../../results/main/meta-analyses/projectivity/rscripts/linear-models.RData")
> # load("../../../results/main/meta-analyses/projectivity/rscripts/linear-models.RData")
> print(summary(glmm6), cor=F, dig=3)
```

```
Linear mixed model fit by REML. t-tests use Satterthwaite's method [
lmerModLmerTest]
Formula: projective ~ op * verb + (1 | workerid) + (1 | content)
   Data: data

REML criterion at convergence: 12825.3

Scaled residuals:
   Min     1Q Median     3Q    Max
-4.034 -0.653  0.039  0.659  4.254

Random effects:
 Groups   Name        Variance Std.Dev.
 workerid (Intercept) 0.026816 0.1638
 content  (Intercept) 0.000269 0.0164
 Residual             0.065256 0.2555
Number of obs: 57160, groups:  workerid, 2682; content, 20

Fixed effects:
                     Estimate Std. Error        df t value Pr(>|t|)
(Intercept)          8.67e-01   1.14e-02  1.48e+03   75.79  < 2e-16 ***
opm                 -1.56e-01   1.56e-02  2.63e+04  -10.04  < 2e-16 ***
opq                  2.49e-02   1.43e-02  5.68e+04    1.74  0.08167 .
opc                 -1.16e-01   1.57e-02  2.62e+04   -7.38  1.6e-13 ***
verbknow            -7.49e-02   1.35e-02  5.44e+04   -5.55  2.9e-08 ***
verbprove           -6.36e-01   1.35e-02  5.44e+04  -47.17  < 2e-16 ***
verbsuggest         -6.16e-01   1.35e-02  5.44e+04  -45.67  < 2e-16 ***
verbacknowledge     -2.20e-01   1.35e-02  5.44e+04  -16.34  < 2e-16 ***
verbadmit           -3.40e-01   1.35e-02  5.44e+04  -25.22  < 2e-16 ***
verbannounce        -3.61e-01   1.35e-02  5.44e+04  -26.74  < 2e-16 ***
verbbe_right        -6.64e-01   1.35e-02  5.44e+04  -49.20  < 2e-16 ***
verbconfess         -3.68e-01   1.35e-02  5.44e+04  -27.28  < 2e-16 ***
verbconfirm         -6.34e-01   1.35e-02  5.44e+04  -46.97  < 2e-16 ***
verbdemonstrate     -5.31e-01   1.35e-02  5.44e+04  -39.33  < 2e-16 ***
verbdiscover        -1.86e-01   1.35e-02  5.44e+04  -13.82  < 2e-16 ***
verbestablish       -5.54e-01   1.35e-02  5.44e+04  -41.08  < 2e-16 ***
verbhear            -1.96e-01   1.35e-02  5.44e+04  -14.50  < 2e-16 ***
verbinform          -1.37e-01   1.35e-02  5.44e+04  -10.19  < 2e-16 ***
verbpretend         -5.05e-01   1.35e-02  5.44e+04  -37.42  < 2e-16 ***
verbreveal          -3.06e-01   1.35e-02  5.44e+04  -22.66  < 2e-16 ***
verbsay             -5.42e-01   1.35e-02  5.44e+04  -40.17  < 2e-16 ***
verbsee             -1.83e-01   1.35e-02  5.44e+04  -13.54  < 2e-16 ***
verbthink           -5.10e-01   1.35e-02  5.44e+04  -37.81  < 2e-16 ***
opm:verbknow         1.30e-02   1.90e-02  5.44e+04    0.69  0.49308
opq:verbknow         5.70e-02   1.93e-02  5.44e+04    2.95  0.00315 **
opc:verbknow         1.14e-01   1.91e-02  5.44e+04    5.99  2.1e-09 ***
opm:verbprove        3.58e-01   1.90e-02  5.44e+04   18.87  < 2e-16 ***
opq:verbprove        2.31e-02   1.93e-02  5.44e+04    1.20  0.23153
opc:verbprove        2.58e-01   1.91e-02  5.44e+04   13.53  < 2e-16 ***
opm:verbsuggest      1.77e-01   1.90e-02  5.44e+04    9.31  < 2e-16 ***
opq:verbsuggest     -7.38e-02   1.93e-02  5.44e+04   -3.82  0.00013 ***
opc:verbsuggest      1.59e-01   1.91e-02  5.44e+04    8.36  < 2e-16 ***
opm:verbacknowledge  1.10e-01   1.90e-02  5.44e+04    5.80  6.6e-09 ***
opq:verbacknowledge  6.73e-02   1.93e-02  5.44e+04    3.49  0.00049 ***
opc:verbacknowledge  1.95e-01   1.91e-02  5.44e+04   10.21  < 2e-16 ***
opm:verbadmit        1.81e-01   1.90e-02  5.44e+04    9.54  < 2e-16 ***
opq:verbadmit        4.40e-02   1.93e-02  5.44e+04    2.28  0.02254 *
opc:verbadmit        2.80e-01   1.91e-02  5.44e+04   14.71  < 2e-16 ***
```

```
opm:verbannounce     1.63e-01   1.90e-02  5.44e+04    8.61  < 2e-16 ***
opq:verbannounce     1.75e-03   1.93e-02  5.44e+04    0.09  0.92758
opc:verbannounce     2.50e-01   1.91e-02  5.44e+04   13.13  < 2e-16 ***
opm:verbbe_right     2.58e-01   1.90e-02  5.44e+04   13.61  < 2e-16 ***
opq:verbbe_right    -7.77e-02   1.93e-02  5.44e+04   -4.03  5.7e-05 ***
opc:verbbe_right     1.42e-01   1.91e-02  5.44e+04    7.47  8.0e-14 ***
opm:verbconfess      1.84e-01   1.90e-02  5.44e+04    9.68  < 2e-16 ***
opq:verbconfess      3.94e-02   1.93e-02  5.44e+04    2.04  0.04128 *
opc:verbconfess      3.11e-01   1.91e-02  5.44e+04   16.32  < 2e-16 ***
opm:verbconfirm      3.66e-01   1.90e-02  5.44e+04   19.31  < 2e-16 ***
opq:verbconfirm      3.13e-02   1.93e-02  5.44e+04    1.62  0.10483
opc:verbconfirm      2.96e-01   1.91e-02  5.44e+04   15.55  < 2e-16 ***
opm:verbdemonstrate  2.78e-01   1.90e-02  5.44e+04   14.67  < 2e-16 ***
opq:verbdemonstrate  7.54e-02   1.93e-02  5.44e+04    3.91  9.4e-05 ***
opc:verbdemonstrate  2.85e-01   1.91e-02  5.44e+04   14.97  < 2e-16 ***
opm:verbdiscover     1.00e-01   1.90e-02  5.44e+04    5.28  1.3e-07 ***
opq:verbdiscover     7.62e-02   1.93e-02  5.44e+04    3.95  7.8e-05 ***
opc:verbdiscover     2.27e-01   1.91e-02  5.44e+04   11.91  < 2e-16 ***
opm:verbestablish    2.88e-01   1.90e-02  5.44e+04   15.18  < 2e-16 ***
opq:verbestablish    6.16e-03   1.93e-02  5.44e+04    0.32  0.74945
opc:verbestablish    2.57e-01   1.91e-02  5.44e+04   13.49  < 2e-16 ***
opm:verbhear        -4.63e-03   1.90e-02  5.44e+04   -0.24  0.80714
opq:verbhear         7.56e-02   1.93e-02  5.44e+04    3.92  8.9e-05 ***
opc:verbhear         2.02e-01   1.91e-02  5.44e+04   10.58  < 2e-16 ***
opm:verbinform       1.41e-02   1.90e-02  5.44e+04    0.75  0.45587
opq:verbinform       5.88e-02   1.93e-02  5.44e+04    3.05  0.00232 **
opc:verbinform       1.28e-01   1.91e-02  5.44e+04    6.71  2.0e-11 ***
opm:verbpretend     -1.94e-02   1.90e-02  5.44e+04   -1.02  0.30596
opq:verbpretend     -2.20e-01   1.93e-02  5.44e+04  -11.39  < 2e-16 ***
opc:verbpretend     -9.02e-02   1.91e-02  5.44e+04   -4.73  2.2e-06 ***
opm:verbreveal       1.77e-01   1.90e-02  5.44e+04    9.32  < 2e-16 ***
opq:verbreveal       6.66e-02   1.93e-02  5.44e+04    3.45  0.00056 ***
opc:verbreveal       2.90e-01   1.91e-02  5.44e+04   15.23  < 2e-16 ***
opm:verbsay          1.45e-01   1.90e-02  5.44e+04    7.65  2.0e-14 ***
opq:verbsay         -1.82e-01   1.93e-02  5.44e+04   -9.41  < 2e-16 ***
opc:verbsay          1.99e-01   1.91e-02  5.44e+04   10.42  < 2e-16 ***
opm:verbsee          5.94e-02   1.90e-02  5.44e+04    3.13  0.00174 **
opq:verbsee          1.11e-01   1.93e-02  5.44e+04    5.75  9.2e-09 ***
opc:verbsee          2.18e-01   1.91e-02  5.44e+04   11.41  < 2e-16 ***
opm:verbthink        1.46e-02   1.90e-02  5.44e+04    0.77  0.44288
opq:verbthink       -1.74e-01   1.93e-02  5.44e+04   -9.01  < 2e-16 ***
opc:verbthink        2.32e-03   1.91e-02  5.44e+04    0.12  0.90314
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```