

Replication validation based on reviewer comments

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Load data

We load all previously generated data, including the collected priors and the model fits for KORA and LOLIPOP.

- Number of sentinels to be processed: 551

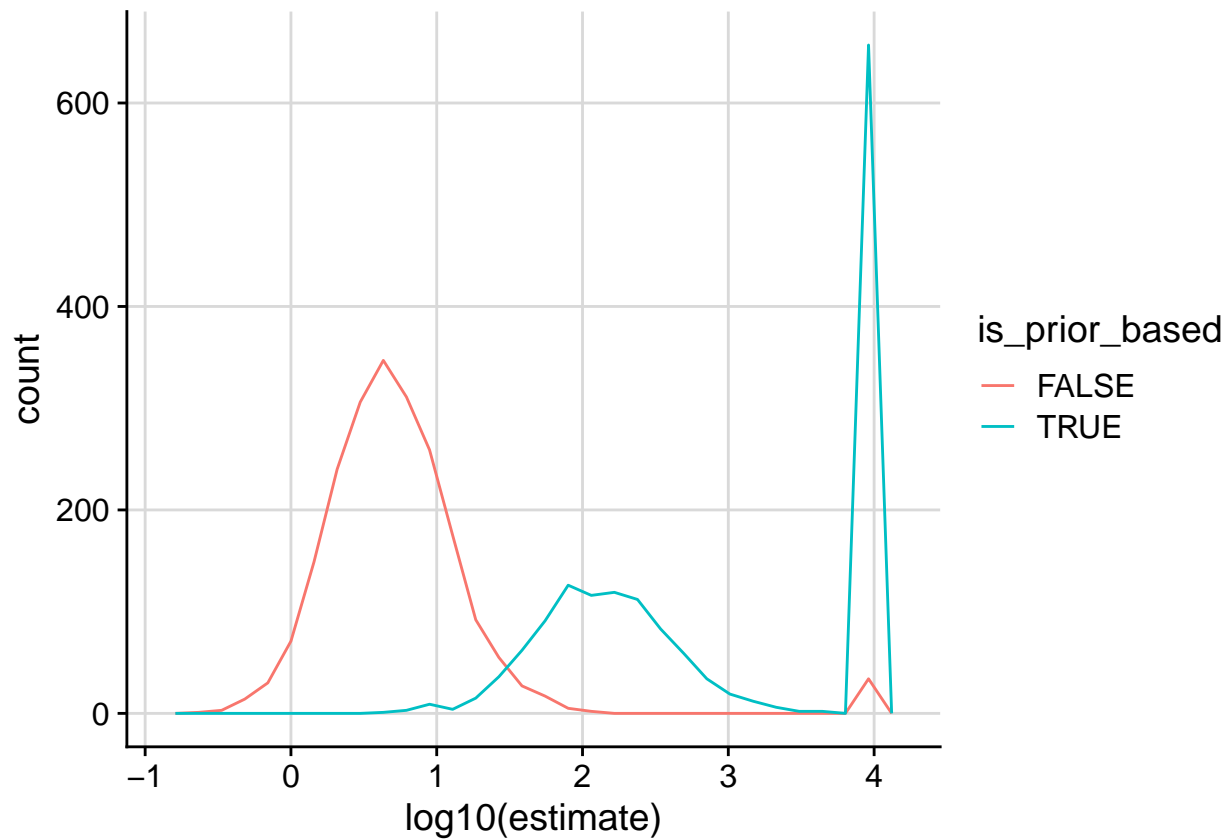
Prior importance for replication

We investigate whether available prior information largely drives replication performance. In brief, we create a contingency table from all sentinels, where we check 1) whether an edge is replicated or not and 2) whether the edge has a prior assigned it or not.

```
## # A tibble: 4,408 x 13
##   sentinel graph_model estimate p.value conf.low conf.high method alternative
##   <chr>      <chr>          <dbl>   <dbl>   <dbl>      <dbl> <chr>   <chr>
## 1 rs10103~ bdgraph      58.8 1.79e- 8    19.5      Inf Fishe~ greater
## 2 rs10103~ bdgraph_no~    0 1.00e+ 0     0      Inf Fishe~ greater
## 3 rs10103~ bdgraph_no~    0 1.00e+ 0     0      Inf Fishe~ greater
## 4 rs10103~ irafnet       0 1.00e+ 0     0      Inf Fishe~ greater
## 5 rs10103~ genenet       0 1.00e+ 0     0      Inf Fishe~ greater
## 6 rs10103~ glasso      307. 6.46e-25   113.      Inf Fishe~ greater
## 7 rs10103~ glasso_no~    0 1.00e+ 0     0      Inf Fishe~ greater
## 8 rs10103~ genie3       0 1.00e+ 0     0      Inf Fishe~ greater
## 9 rs10120~ bdgraph      85.6 2.27e-29   44.4      Inf Fishe~ greater
## 10 rs10120~ bdgraph_no~  10.1 2.47e- 6     4.63      Inf Fishe~ greater
## # ... with 4,398 more rows, and 5 more variables: prior_and_replicated <dbl>,
## #   prior_not_replicated <dbl>, not_prior_and_replicated <dbl>,
## #   not_prior_not_replicated <dbl>, is_prior_based <lgl>

## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

## Warning: Removed 702 rows containing non-finite values (stat_bin).
```

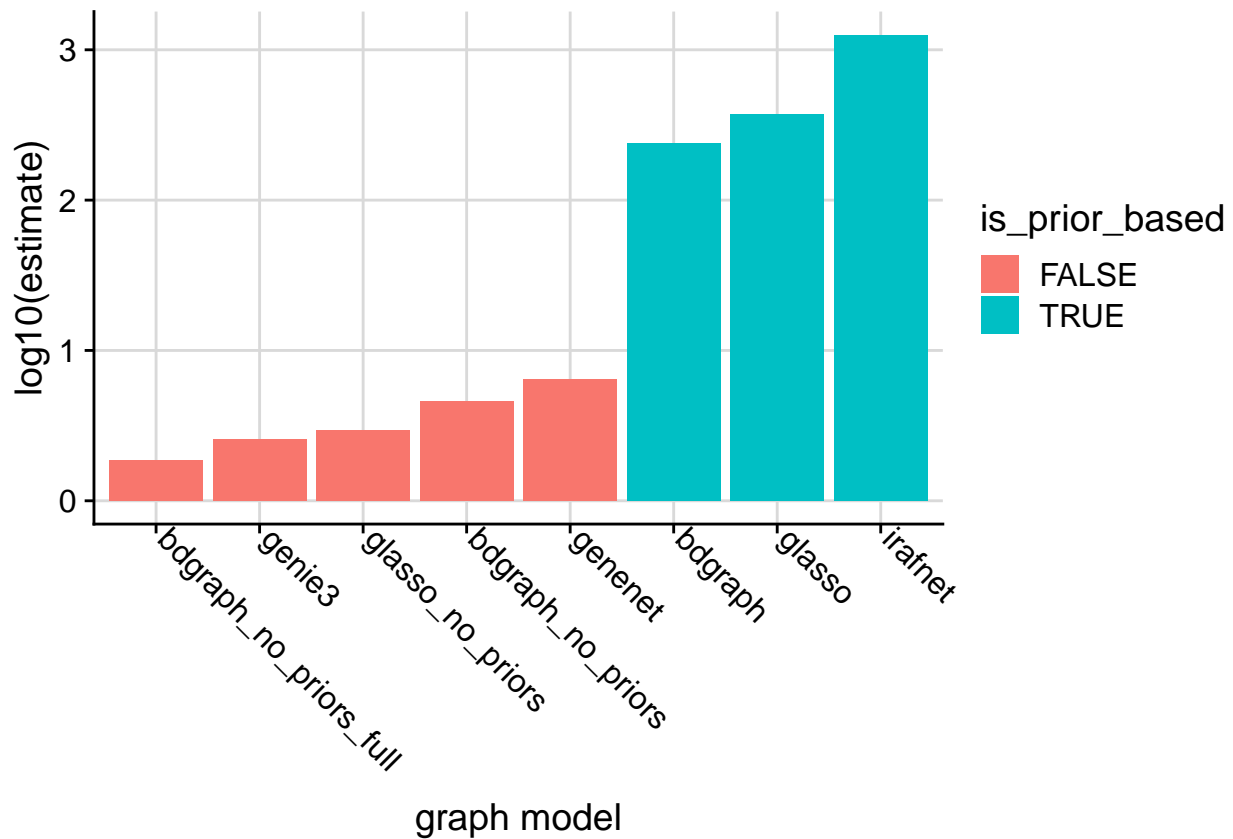


Above are the initial ‘full’ results, i.e. for each graph model and sentinel, we see the evaluation by use of the fisher test.

The plot indicates the distribution (log10) of estimates over all models and sentinels. **estimates** amounting to **Inf** were substituted by **10e4** and result in the peaks located at the far right of the plot.

Now we look at a simple summary, where we sum up all contingency tables and calculate a single fisher test for each of the graph models.

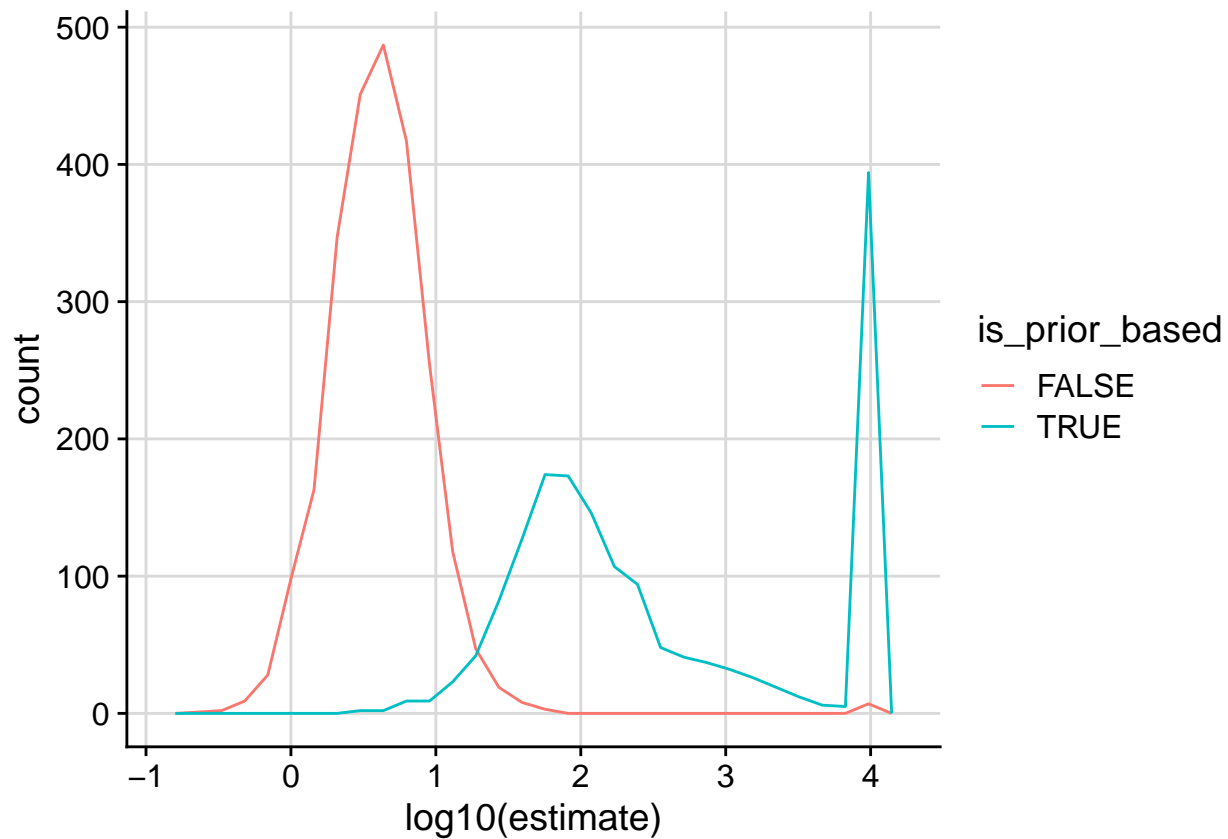
```
## # A tibble: 8 x 12
##   graph_model estimate p.value conf.low conf.high method alternative
##   <chr>         <dbl>   <dbl>   <dbl>    <dbl> <chr>   <chr>
## 1 bdgraph      238.     0     230.     Inf  Fishe~ greater
## 2 bdgraph_no~  4.62     0     4.51     Inf  Fishe~ greater
## 3 bdgraph_no~  1.87     0     1.85     Inf  Fishe~ greater
## 4 genenet      6.38     0     6.04     Inf  Fishe~ greater
## 5 genie3       2.58     0     2.54     Inf  Fishe~ greater
## 6 glasso       373.     0    365.     Inf  Fishe~ greater
## 7 glasso_no~   2.94     0     2.87     Inf  Fishe~ greater
## 8 irafnet     1257.     0   1078.     Inf  Fishe~ greater
## # ... with 5 more variables: prior_and_replicated <dbl>,
## #   prior_not_replicated <dbl>, not_prior_and_replicated <dbl>,
## #   not_prior_not_replicated <dbl>, is_prior_based <lgl>
```



Prior importance inferred edge set

Contrary to the replicated edge set above, we can also have a look at the ‘inferred’ edge set, which are defined as the union of the edge sets from KORA and LOLIPOP.

```
## # A tibble: 4,408 x 13
##   sentinel graph_model estimate p.value conf.low conf.high method alternative
##   <chr>    <chr>          <dbl>    <dbl>    <dbl>    <dbl>    <chr>    <chr>
## 1 rs10103~ bdgraph      22.9  1.24e- 8   9.55      Inf  Fishe~ greater
## 2 rs10103~ bdgraph_no~    0.596 8.16e- 1   0.0290    Inf  Fishe~ greater
## 3 rs10103~ bdgraph_no~    0.620 8.04e- 1   0.0301    Inf  Fishe~ greater
## 4 rs10103~ irafnet      46.7  1.83e- 3   5.95      Inf  Fishe~ greater
## 5 rs10103~ genenet      1.43  5.17e- 1   0.0690    Inf  Fishe~ greater
## 6 rs10103~ glasso      208.  2.06e-24   67.9      Inf  Fishe~ greater
## 7 rs10103~ glasso_no_~    0  1.00e+ 0   0          Inf  Fishe~ greater
## 8 rs10103~ genie3      0  1.00e+ 0   0          Inf  Fishe~ greater
## 9 rs10120~ bdgraph     119.  2.61e-46   62.6      Inf  Fishe~ greater
## 10 rs10120~ bdgraph_no~  15.4  3.31e-17   9.07      Inf  Fishe~ greater
## # ... with 4,398 more rows, and 5 more variables: prior_and_inferred <dbl>,
## #   prior_not_inferred <dbl>, not_prior_and_inferred <dbl>,
## #   not_prior_not_inferred <dbl>, is_prior_based <lgl>
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## Warning: Removed 339 rows containing non-finite values (stat_bin).
```



Session Info

```
## - Session info -----
## setting value
## version R version 3.6.1 (2019-07-05)
## os Debian GNU/Linux 9 (stretch)
## system x86_64, linux-gnu
## ui X11
## language (EN)
## collate en_US.UTF-8
## ctype en_US.UTF-8
## tz Etc/UTC
## date 2021-03-19
##
## - Packages -----
## package * version date lib source
## assertthat 0.2.1 2019-03-21 [1] CRAN (R 3.6.1)
## backports 1.1.5 2019-10-02 [1] CRAN (R 3.6.1)
## BDgraph * 2.62 2019-12-05 [1] CRAN (R 3.6.1)
## BiocGenerics * 0.32.0 2019-10-29 [1] Bioconductor
## broom 0.5.2 2019-04-07 [1] CRAN (R 3.6.1)
## callr 3.3.2 2019-09-22 [1] CRAN (R 3.6.1)
## cli 1.1.0 2019-03-19 [1] CRAN (R 3.6.1)
## colorspace 1.4-1 2019-03-18 [1] CRAN (R 3.6.1)
## cowplot * 1.0.0 2019-07-11 [1] CRAN (R 3.6.1)
## crayon 1.3.4 2017-09-16 [1] CRAN (R 3.6.1)
```

```

## desc                1.2.0    2018-05-01 [1] CRAN (R 3.6.1)
## devtools            2.2.1    2019-09-24 [1] CRAN (R 3.6.1)
## digest              0.6.23   2019-11-23 [1] CRAN (R 3.6.1)
## dplyr               * 0.8.3    2019-07-04 [1] CRAN (R 3.6.1)
## ellipsis            0.3.0    2019-09-20 [1] CRAN (R 3.6.1)
## evaluate            0.14     2019-05-28 [1] CRAN (R 3.6.1)
## fansi               0.4.0    2018-10-05 [1] CRAN (R 3.6.1)
## farver              2.0.1    2019-11-13 [1] CRAN (R 3.6.1)
## fs                  1.3.1    2019-05-06 [1] CRAN (R 3.6.1)
## generics            0.0.2    2018-11-29 [1] CRAN (R 3.6.1)
## ggplot2             * 3.2.1    2019-08-10 [1] CRAN (R 3.6.1)
## glue                1.3.1    2019-03-12 [1] CRAN (R 3.6.1)
## graph               * 1.64.0   2019-10-29 [1] Bioconductor
## gtable              0.3.0    2019-03-25 [1] CRAN (R 3.6.1)
## hms                 0.5.2    2019-10-30 [1] CRAN (R 3.6.1)
## htmltools           0.4.0    2019-10-04 [1] CRAN (R 3.6.1)
## igraph              * 1.2.4.2  2019-11-27 [1] CRAN (R 3.6.1)
## knitr               1.26     2019-11-12 [1] CRAN (R 3.6.1)
## labeling            0.3       2014-08-23 [1] CRAN (R 3.6.1)
## lattice             0.20-38  2018-11-04 [2] CRAN (R 3.6.1)
## lazyeval            0.2.2    2019-03-15 [1] CRAN (R 3.6.1)
## lifecycle           0.1.0    2019-08-01 [1] CRAN (R 3.6.1)
## magrittr            1.5       2014-11-22 [1] CRAN (R 3.6.1)
## memoise             1.1.0    2017-04-21 [1] CRAN (R 3.6.1)
## munsell             0.5.0    2018-06-12 [1] CRAN (R 3.6.1)
## nlme                 3.1-140  2019-05-12 [2] CRAN (R 3.6.1)
## pillar              1.4.2    2019-06-29 [1] CRAN (R 3.6.1)
## pkgbuild            1.0.6    2019-10-09 [1] CRAN (R 3.6.1)
## pkgconfig           2.0.3    2019-09-22 [1] CRAN (R 3.6.1)
## pkgload             1.0.2    2018-10-29 [1] CRAN (R 3.6.1)
## plyr                1.8.4    2016-06-08 [1] CRAN (R 3.6.1)
## prettyunits         1.0.2    2015-07-13 [1] CRAN (R 3.6.1)
## processx            3.4.1    2019-07-18 [1] CRAN (R 3.6.1)
## ps                  1.3.0    2018-12-21 [1] CRAN (R 3.6.1)
## purrr               0.3.3    2019-10-18 [1] CRAN (R 3.6.1)
## R6                   2.4.1    2019-11-12 [1] CRAN (R 3.6.1)
## Rcpp                1.0.3    2019-11-08 [1] CRAN (R 3.6.1)
## readr               * 1.3.1    2018-12-21 [1] CRAN (R 3.6.1)
## remotes             2.1.0    2019-06-24 [1] CRAN (R 3.6.1)
## reshape2           * 1.4.3    2017-12-11 [1] CRAN (R 3.6.1)
## rlang               0.4.2    2019-11-23 [1] CRAN (R 3.6.1)
## rmarkdown           1.17     2019-11-13 [1] CRAN (R 3.6.1)
## rprojroot           1.3-2    2018-01-03 [1] CRAN (R 3.6.1)
## scales              1.1.0    2019-11-18 [1] CRAN (R 3.6.1)
## sessioninfo         1.1.1    2018-11-05 [1] CRAN (R 3.6.1)
## stringi             1.4.3    2019-03-12 [1] CRAN (R 3.6.1)
## stringr             1.4.0    2019-02-10 [1] CRAN (R 3.6.1)
## testthat            2.3.0    2019-11-05 [1] CRAN (R 3.6.1)
## tibble              2.1.3    2019-06-06 [1] CRAN (R 3.6.1)
## tidyr               1.0.0    2019-09-11 [1] CRAN (R 3.6.1)
## tidyselect          0.2.5    2018-10-11 [1] CRAN (R 3.6.1)
## usethis             1.5.1    2019-07-04 [1] CRAN (R 3.6.1)
## utf8                1.1.4    2018-05-24 [1] CRAN (R 3.6.1)
## vctrs               0.2.0    2019-07-05 [1] CRAN (R 3.6.1)

```

```
## withr          2.1.2    2018-03-15 [1] CRAN (R 3.6.1)
## xfun           0.11     2019-11-12 [1] CRAN (R 3.6.1)
## yaml          2.2.0     2018-07-25 [1] CRAN (R 3.6.1)
## zeallot        0.1.0     2018-01-28 [1] CRAN (R 3.6.1)
##
## [1] /usr/local/lib/R/site-library
## [2] /usr/local/lib/R/library
```