Preliminary analysis

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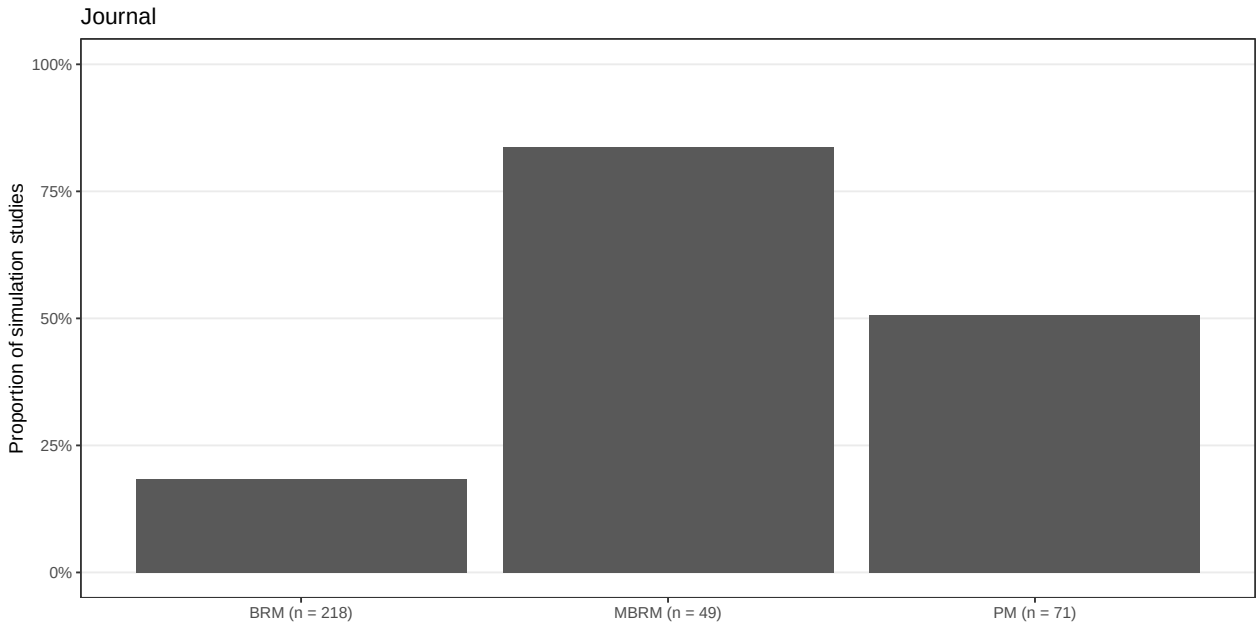
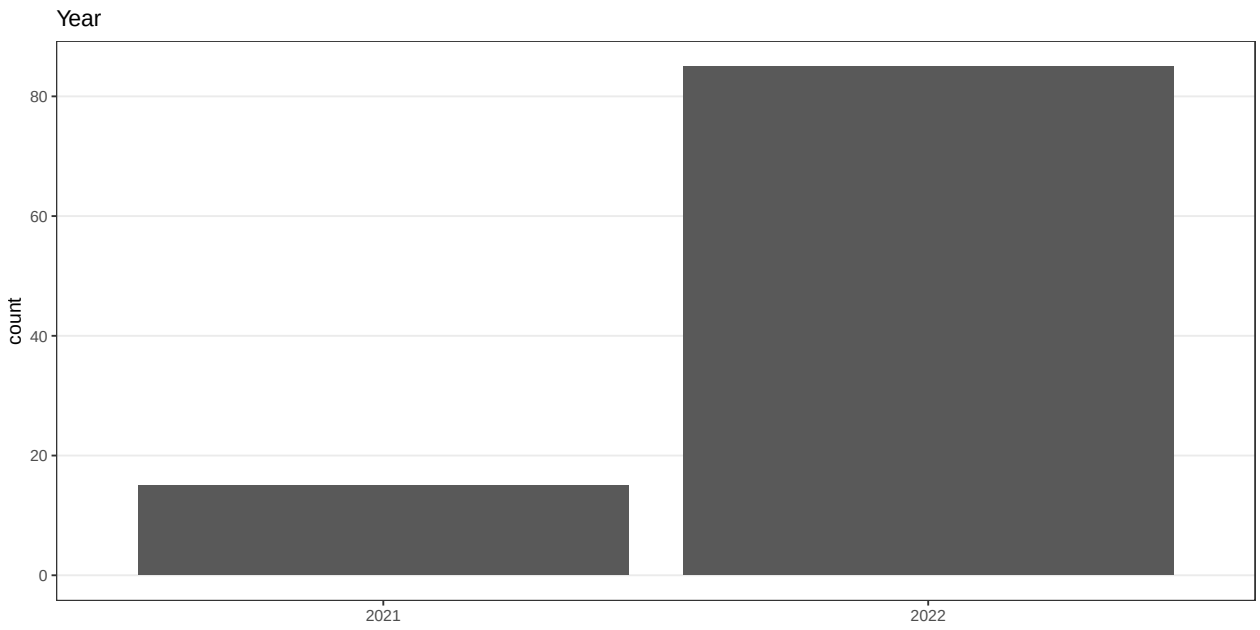
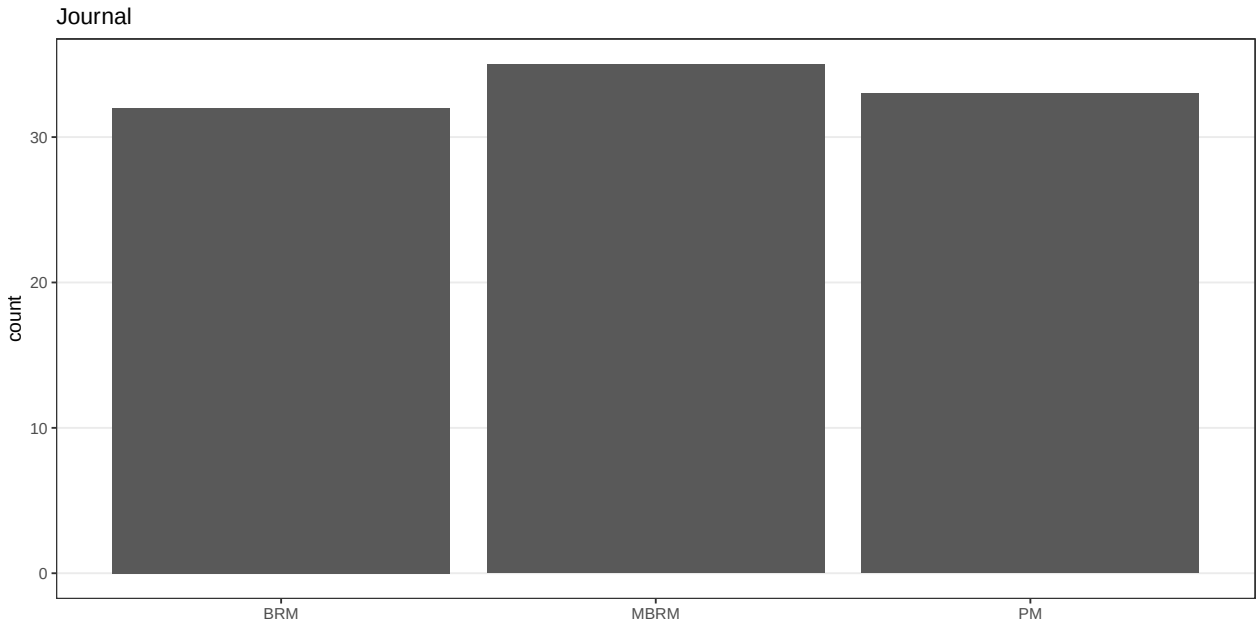
```
## libraries
library(dplyr)
library(tidyr)
library(ggplot2)
library(colorspace)
library(ggpubr)
library(stringr)
library(forcats)
theme_set(theme_bw() +
          theme(legend.position = "top",
                panel.grid.minor = element_blank()))
pal <- "Harmonic" # change palette here
## colorspace::hcl_palettes("qualitative", plot = TRUE)

## data
sim_res_fac_full <- readRDS(file = "data/sim_res_fac.RDS")
sim_res_num_full <- readRDS(file = "data/sim_res_num.RDS")

# subset assessment only
sim_res_fac  <- sim_res_fac_full %>%
    filter(simstudy_q1 == "yes",
           coding_type == "assessment")
sim_res_num  <- sim_res_num_full %>%
    filter(simstudy_q1 == "yes",
           coding_type == "assessment")

## proportion of simulation studies by journal
sim_res_fac_full %>%
    group_by(journal) %>%
    summarize(propSim = mean(simstudy_q1 == "yes"),
              n = n()) %>%
    mutate(journalLab = paste0(journal, " (n = ", n, ")")) %>%
    ggplot(aes(x = journalLab, y = propSim)) +
    geom_bar(stat = "identity") +
    scale_y_continuous(labels = scales::percent, limits = c(0, 1)) +
    labs(x = NULL, title ="Journal", y = "Proportion of simulation studies") +
    theme(panel.grid.major.x = element_blank())
```



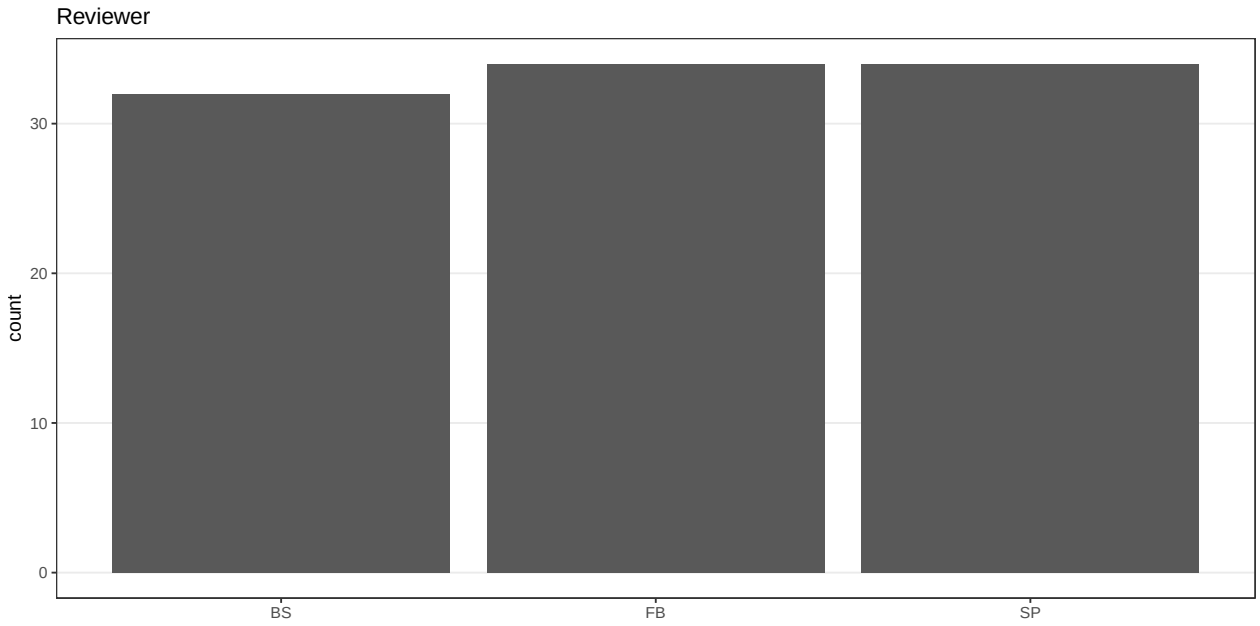

```
## year
ggplot(data = sim_res_fac, aes(x = factor(year))) +
    geom_bar() +
    labs(x = NULL, title ="Year") +
    theme(panel.grid.major.x = element_blank())
```




```
## journal
ggplot(data = sim_res_fac, aes(x = journal)) +
    geom_bar() +
    labs(x = NULL, title ="Journal") +
    theme(panel.grid.major.x = element_blank())
```

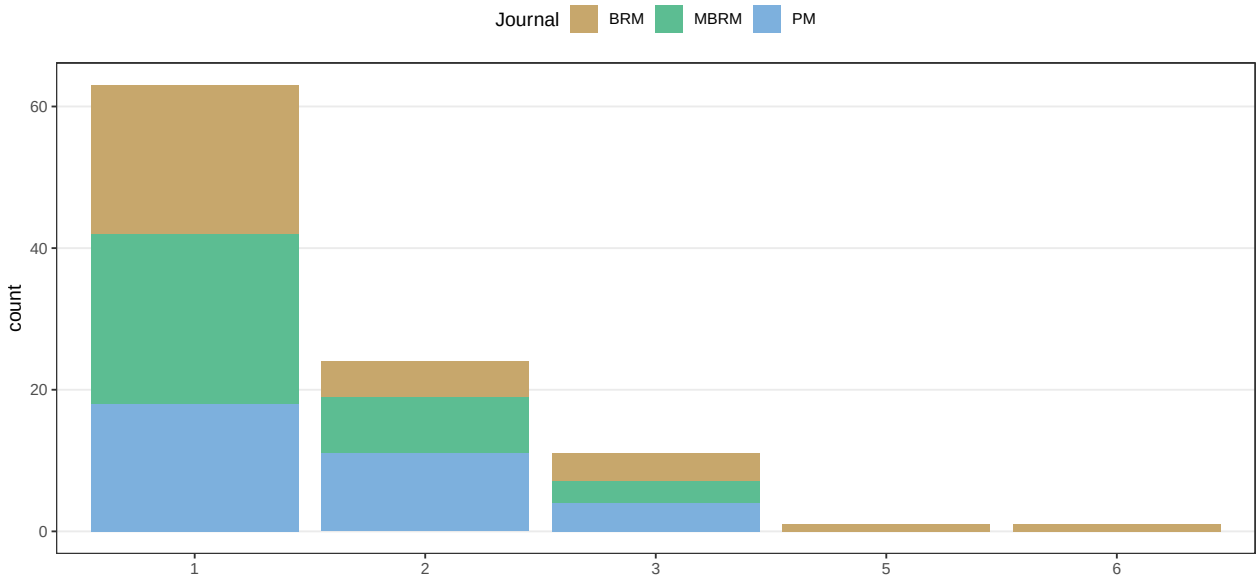



```
## reviewer
ggplot(data = sim_res_fac, aes(x = reviewer)) +
    geom_bar() +
    labs(x = NULL, title ="Reviewer") +
    theme(panel.grid.major.x = element_blank())
```



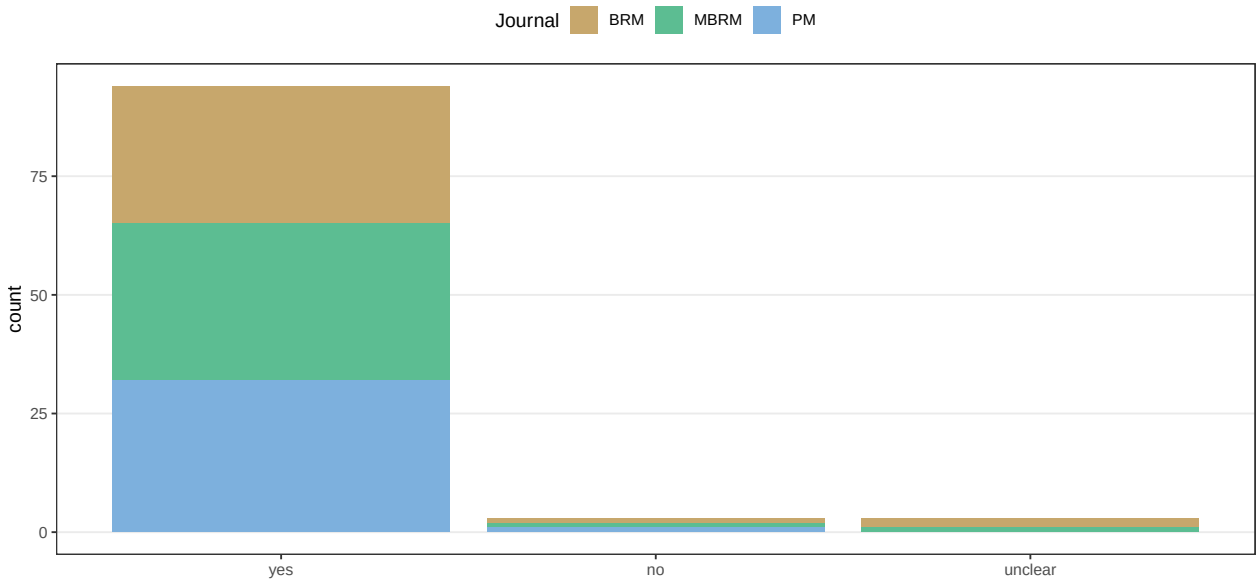

```
## Q2 number of simulation studies
q2 <- ggplot(data = sim_res_fac, aes(x = nsimstudies_q2, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title ="Number of simulation studies in article", fill = "Journal") +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.x = element_blank())
q2
```

Number of simulation studies in article



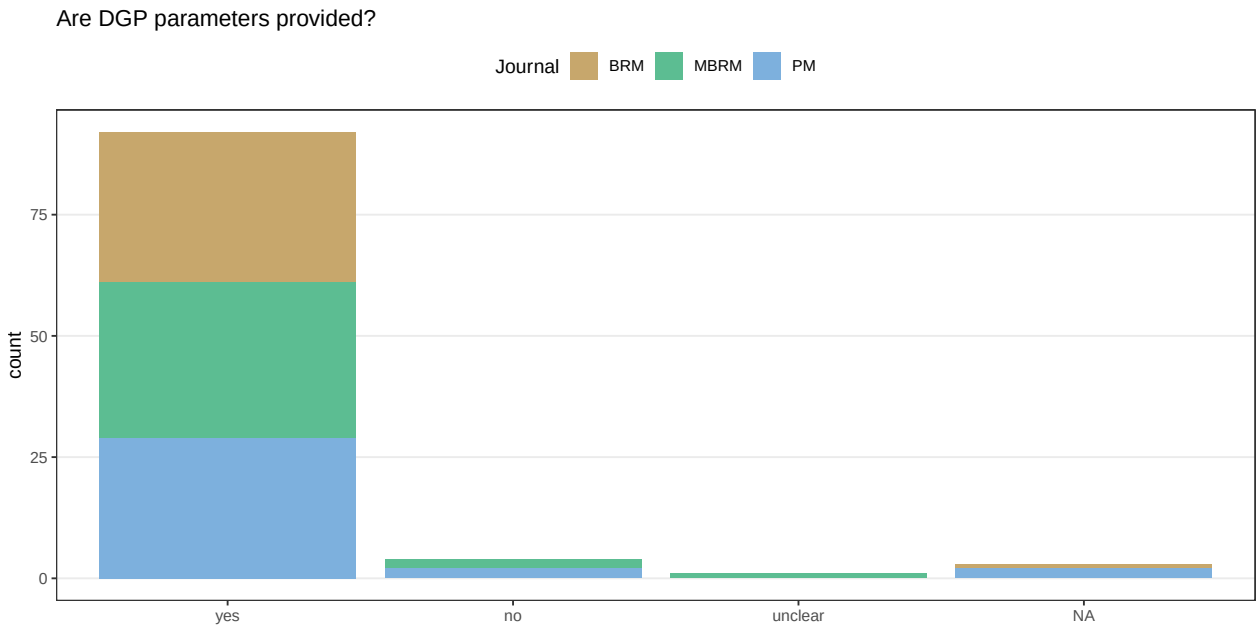

```
## Q3 are the aims of the study defined
q3 <- sim_res_fac %>%
    mutate(aimsdefined_q3 = factor(aimsdefined_q3,
                                   levels = c("yes", "no", "unclear"))) %>%
ggplot(aes(x = aimsdefined_q3, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title ="Aims of the study defined?", fill = "Journal") +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.x = element_blank())
q3
```

Aims of the study defined?




```
## Q4 type of DGP
q4 <- ggplot(data = sim_res_fac, aes(x = dgptype_q4, fill = journal)) +
    geom_bar() +
```

```
    labs(x = NULL, title ="Type of DGP", fill = "Journal") +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.x = element_blank())

## Q5 DGP parameters provided?
q5 <- sim_res_fac %>%
    mutate(dgpparameters_q5 = factor(dgpparameters_q5,
                                     levels = c("yes", "no", "unclear"))) %>%
ggplot(aes(x = dgpparameters_q5, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title ="Are DGP parameters provided?", fill = "Journal") +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.x = element_blank())
q5
```



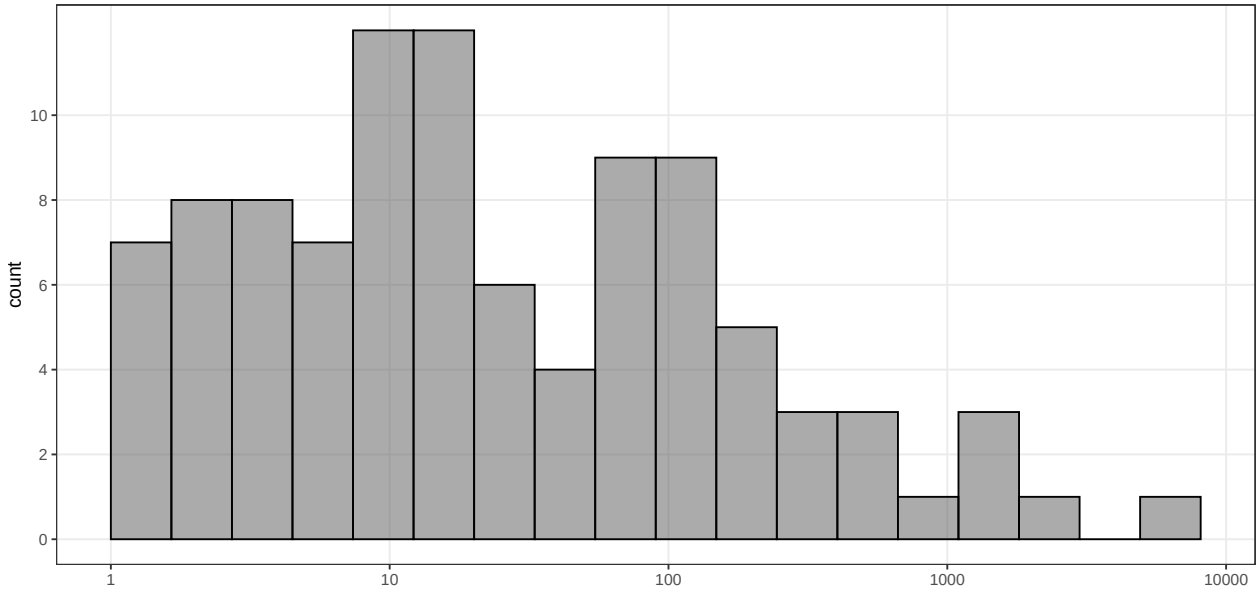

```
## Q6 How many conditions?
summary(sim_res_num$nconds_q6)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##     1.0     5.0    16.0   185.8    96.0  6000.0       1
```

```
breaks <- c(1, 10, 100, 1000, 10000)
q6 <- ggplot(data = sim_res_num, aes(x = log(nconds_q6))) +
    geom_histogram(breaks = seq(0, log(10000), 0.5), col = 1, alpha = 0.5) +
    scale_x_continuous(breaks = log(breaks), labels = breaks) +
    scale_y_continuous(breaks = seq(0, 10, 2)) +
    labs(x = NULL, title ="How many simulation conditions?", fill = "Journal")
q6
```

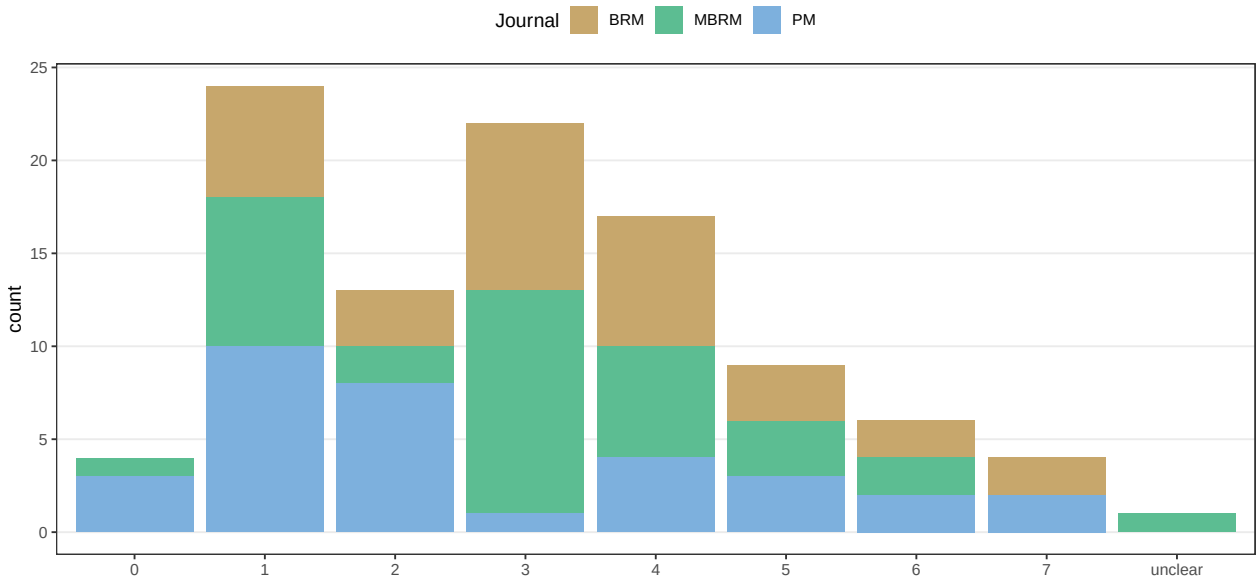
```
## Warning: Removed 1 rows containing non-finite values (`stat_bin()`).
```

How many simulation conditions?




```
## Q7 How many factors?
q7a <- sim_res_num %>%
    mutate(factorsvaried_q7_fac = ifelse(is.na(factorsvaried_q7),
                                         "unclear", factorsvaried_q7)) %>%
    ggplot(aes(x = factorsvaried_q7_fac, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title ="How many factors varied?", fill = "Journal") +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.x = element_blank())
q7a
```

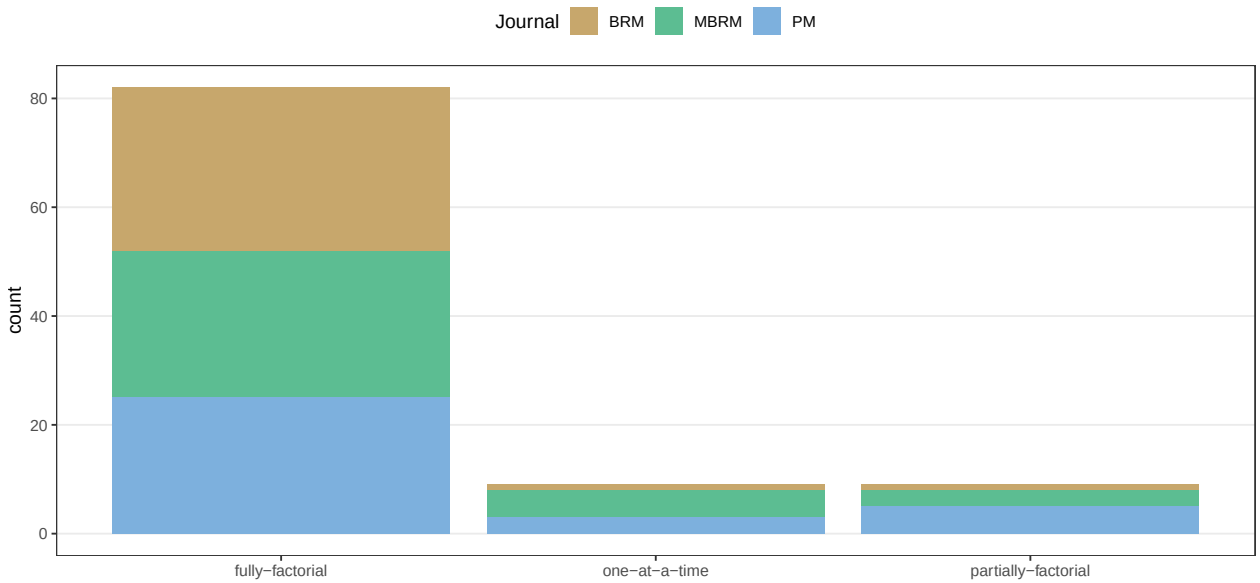
How many factors varied?




```
## Q7 Fully factorial?
q7b <- ggplot(data = sim_res_fac, aes(x = dgmfactorial_q7, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title ="How are factors varied?", fill = "Journal") +
```

```
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.x = element_blank())
q7b
```

How are factors varied?



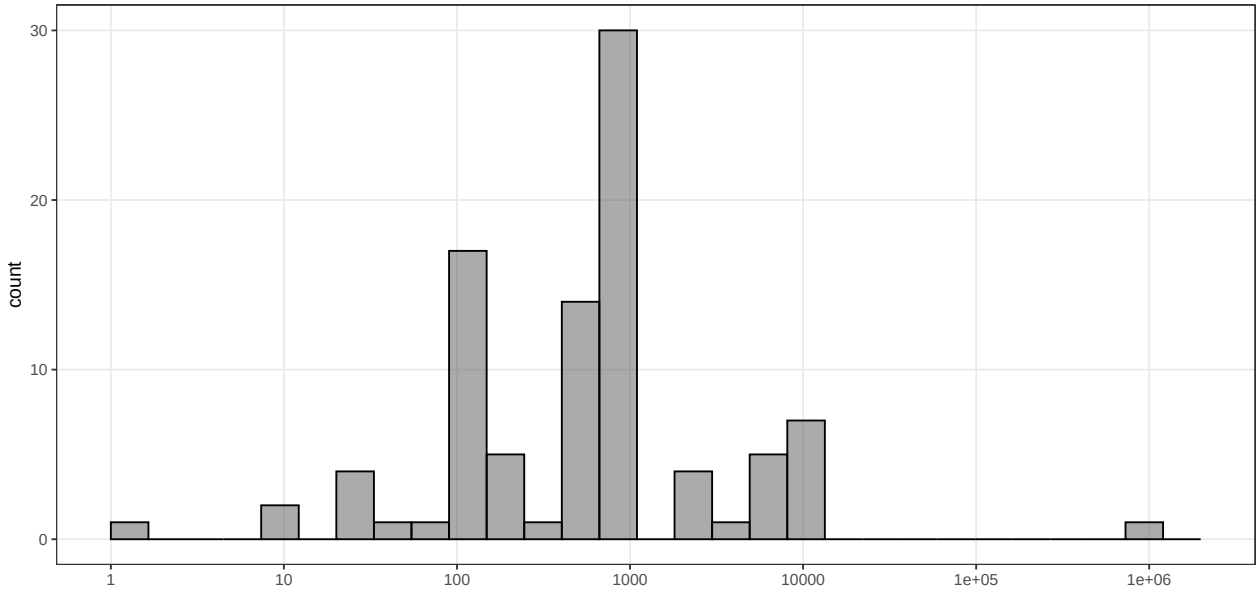

```
## Q8 How many repetitions?
summary(sim_res_num$nsim_q8)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##       1     100     900   12198    1000 1000000       6
```

```
breaks <- c(1, 10, 100, 1000, 10000, 100000, 1000000)
q8 <- ggplot(data = sim_res_num, aes(x = log(nsim_q8))) +
    geom_histogram(breaks = seq(0, log(2000000), 0.5), col = 1, alpha = 0.5) +
    labs(x = NULL, title ="How many repetitions?", fill = "Journal") +
    scale_x_continuous(breaks = log(breaks), labels = breaks)
q8
```

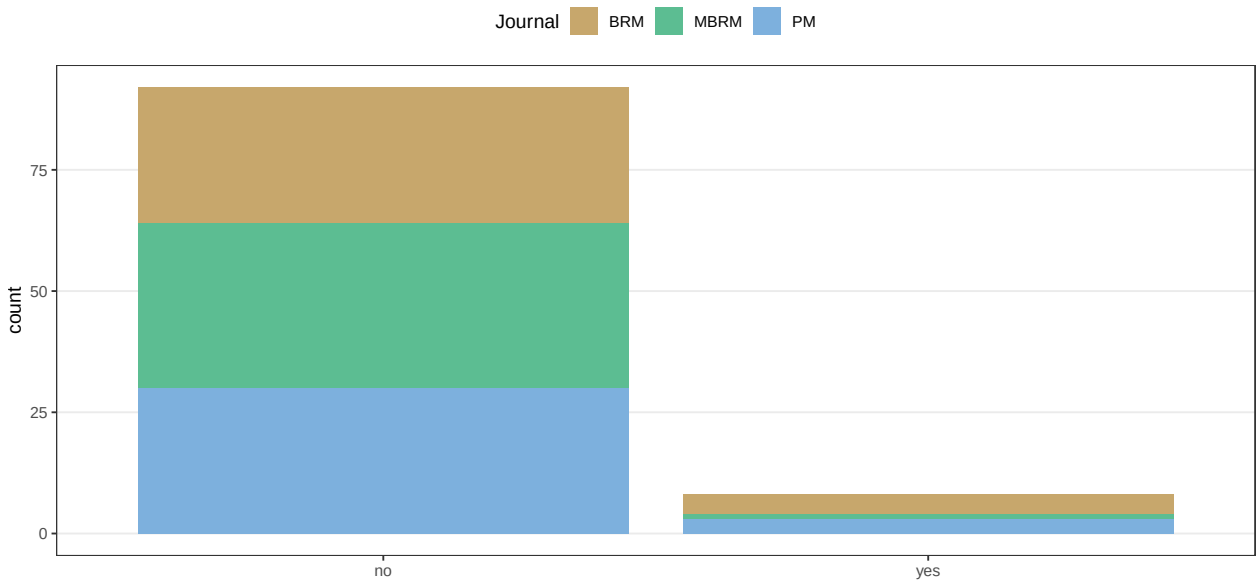
```
## Warning: Removed 6 rows containing non-finite values (`stat_bin()`).
```

How many repetitions?




```
## Q9 Are the number of repetitions justified?
q9 <- ggplot(data = sim_res_fac, aes(x = nsimjustified_q9, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title = "Are the number of repetitions justified?", fill = "Journal") +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.x = element_blank())
q9
```

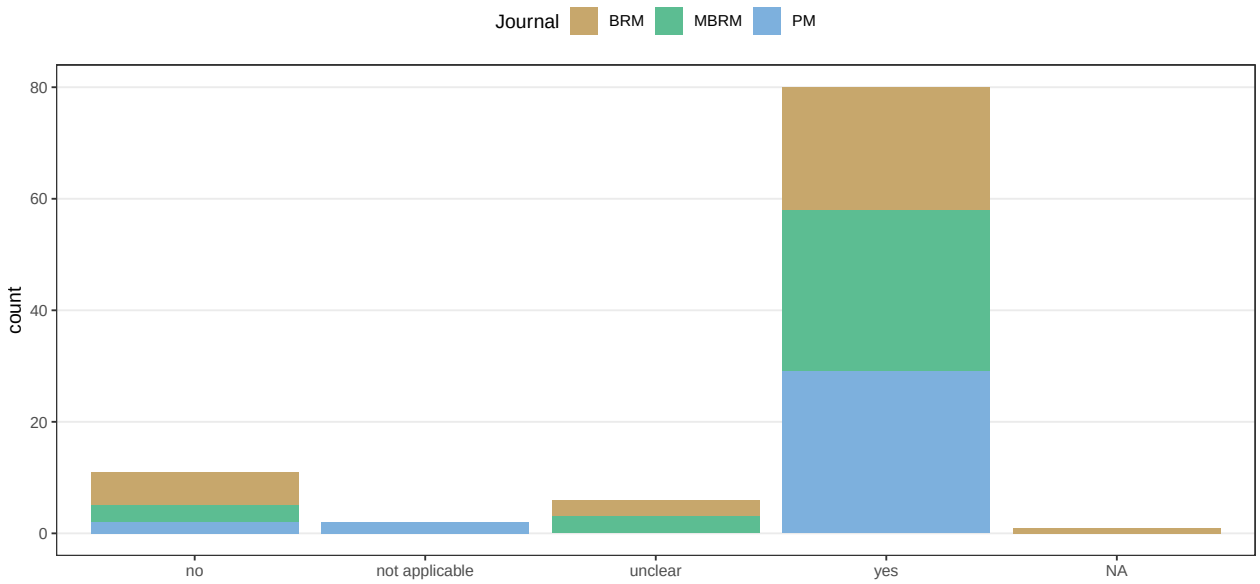
Are the number of repetitions justified?




```
## Q10 Is the estimand stated?
q10 <- ggplot(data = sim_res_fac, aes(x = estimandstated_q10, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title ="Is the estimand stated?", fill = "Journal") +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.x = element_blank())
```

```
q10
```

Is the estimand stated?

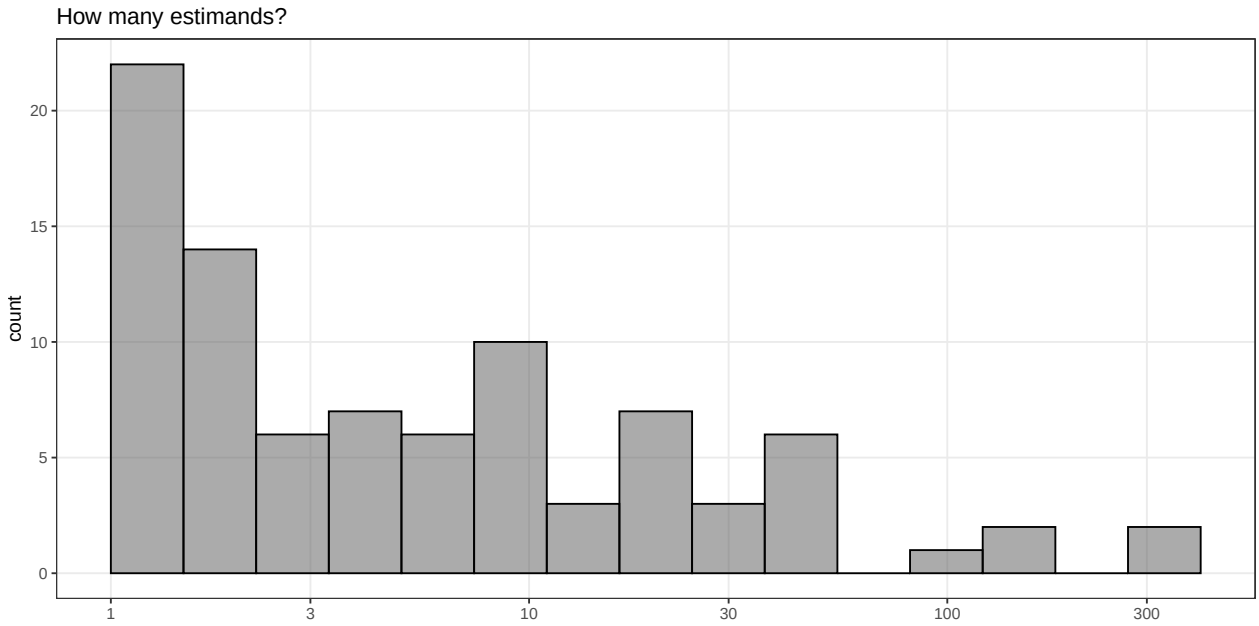



```
## Q11 How many estimands?
summary(sim_res_num$nestimands_q11)
```

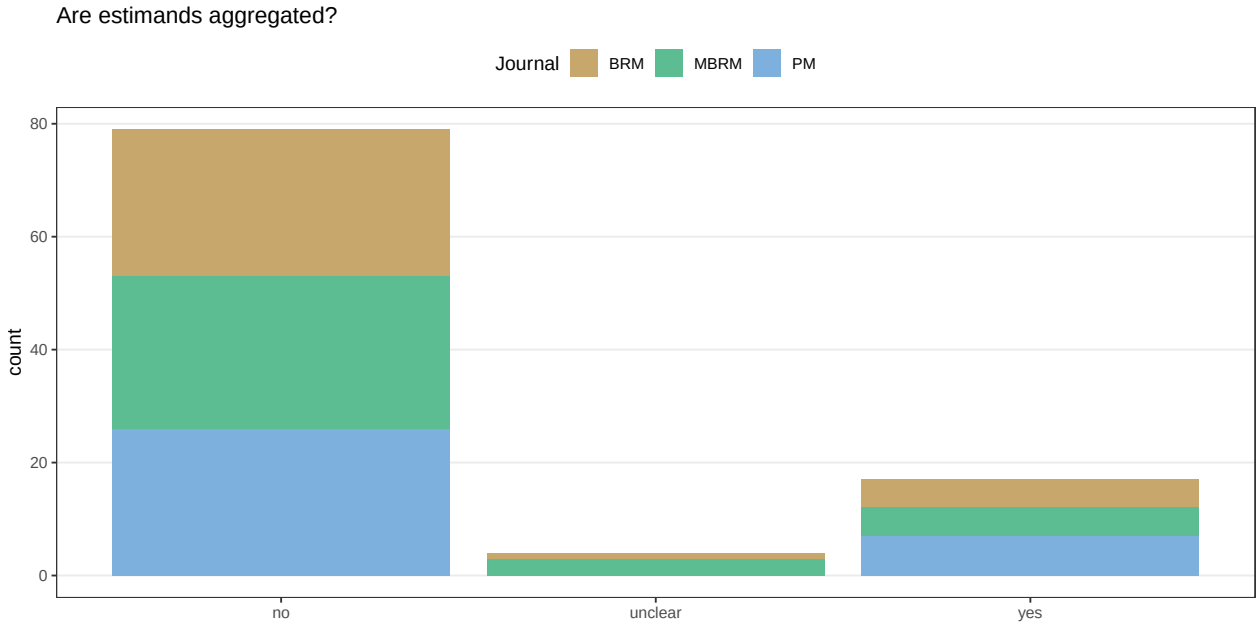
```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##    1.00    2.00    4.00   20.11   15.00  384.00      11
```

```
breaks <- c(1, 3, 10, 30, 100, 300)
q11 <- ggplot(data = sim_res_num, aes(x = log(nestimands_q11))) +
    geom_histogram(breaks = seq(0, log(500), 0.4), col = 1, alpha = 0.5) +
    scale_x_continuous(breaks = log(breaks), labels = breaks) +
    labs(x = NULL, title ="How many estimands?", fill = "Journal")
q11
```

```
## Warning: Removed 11 rows containing non-finite values (`stat_bin()`).
```



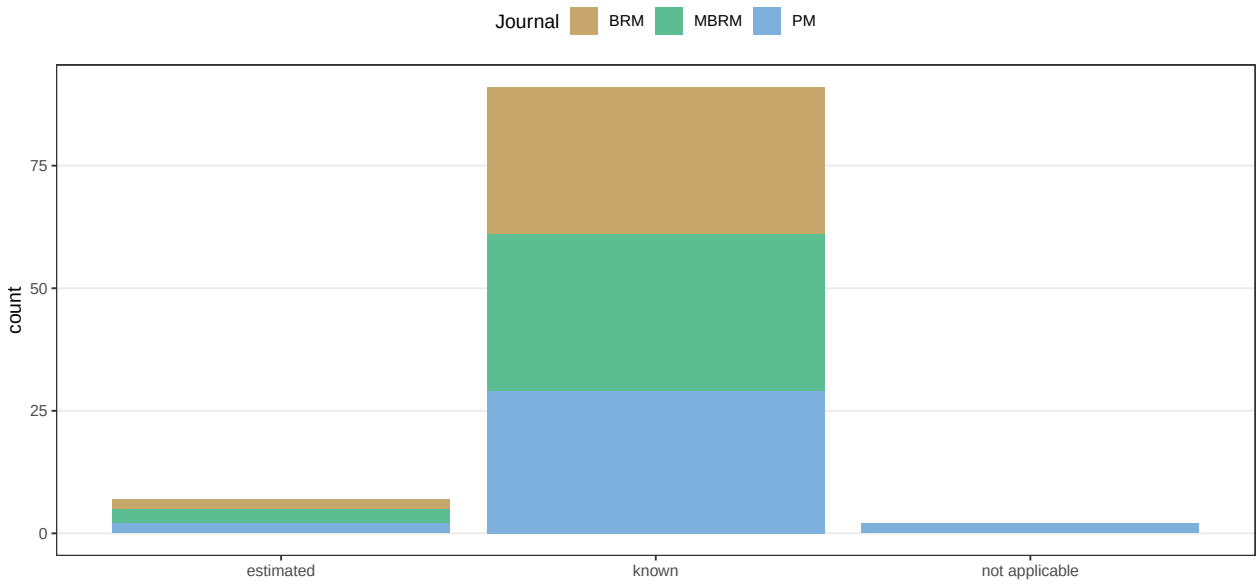

```
## Q12 Are estimands aggregated?
q12 <- ggplot(data = sim_res_fac, aes(x = estimandsagg_q12, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title ="Are estimands aggregated?", fill = "Journal") +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.x = element_blank())
q12
```




```
## Q13 How are the true parameters specified?
q13 <- ggplot(data = sim_res_fac, aes(x = truetheta_q13, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title ="How are the true parameters specified?", fill = "Journal") +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.x = element_blank())
```

```
q13
```

How are the true parameters specified?



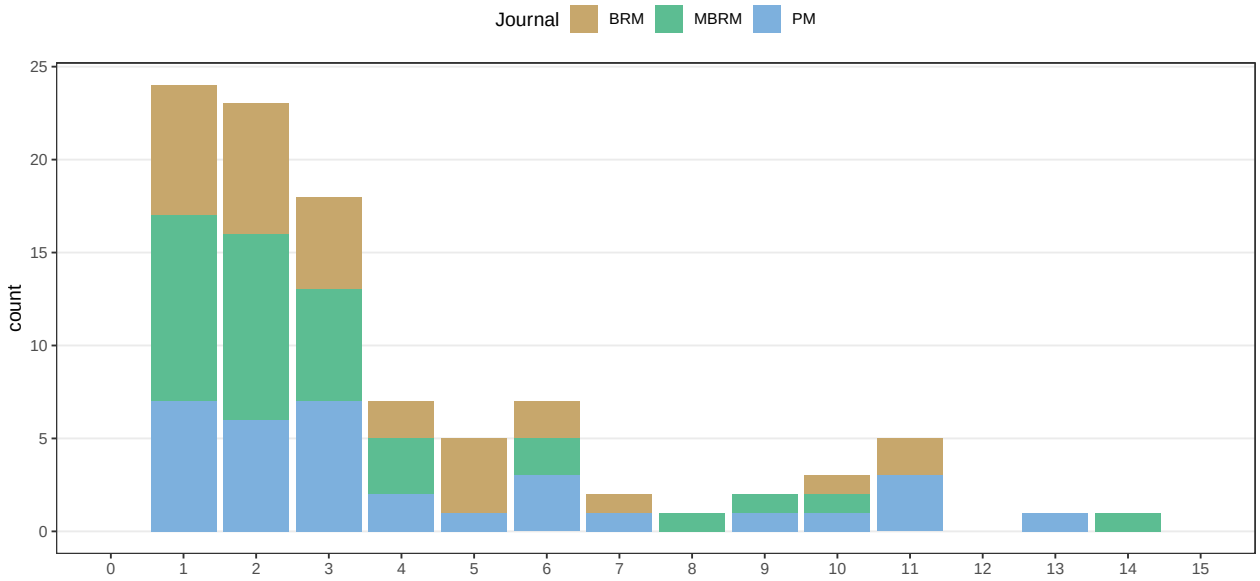

```
## Q14 How many methods are included?
summary(sim_res_num$nmethods_q14)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    1.00    2.00    3.00    5.63    5.00  192.00
```

```
# HACK there is one study with 192 methods, let's exclude it for a moment
q14 <- ggplot(data = sim_res_num, aes(x = nmethods_q14, fill = journal)) +
    geom_bar() +
    scale_x_continuous(breaks = seq(0, 15), limits = c(0, 15)) +
    labs(x = NULL, title ="How many methods are included?", fill = "Journal") +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.x = element_blank())
q14
```

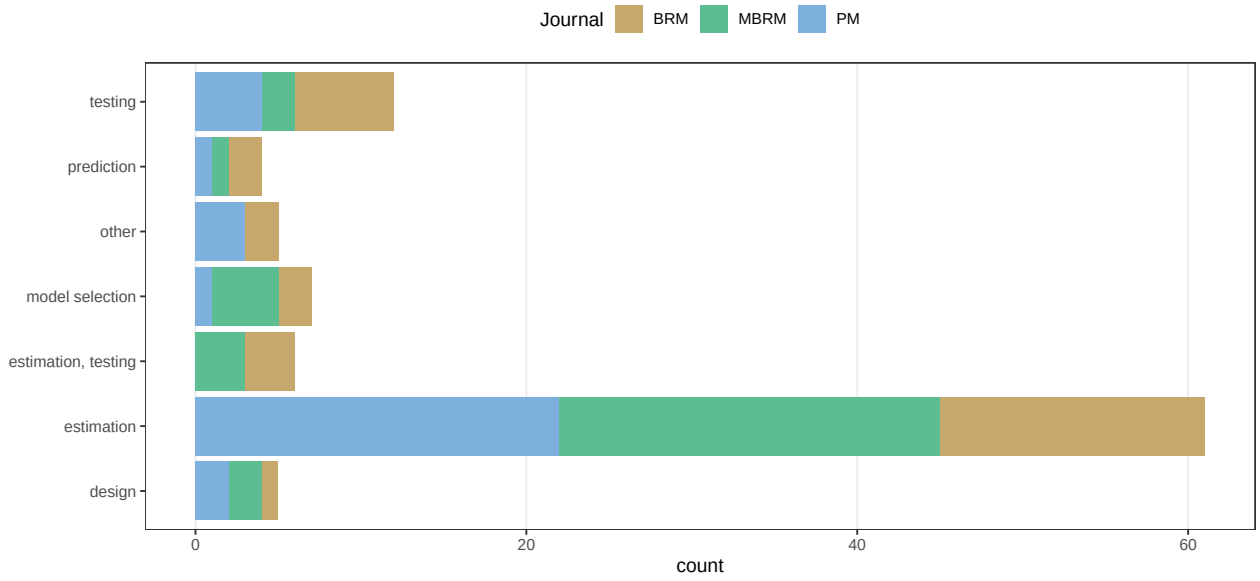
```
## Warning: Removed 1 rows containing non-finite values (`stat_count()`).
```

How many methods are included?



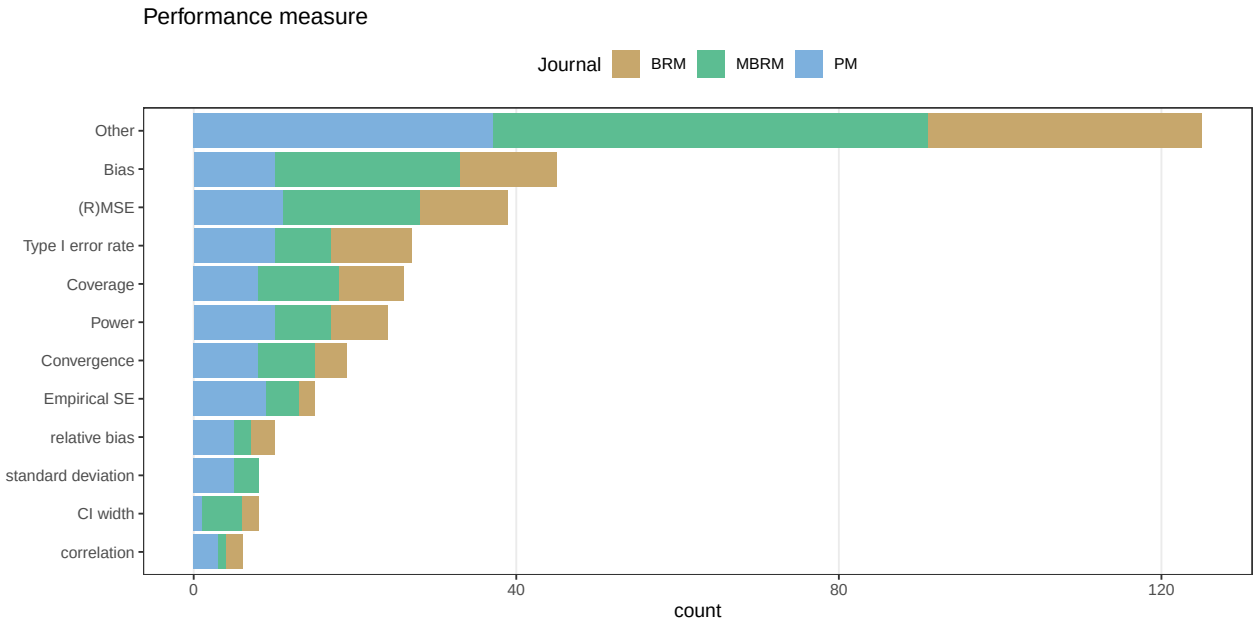

```
## Q15 What is the evaluation target of the simulation?
q15a <- ggplot(data = sim_res_fac, aes(x = target_q15, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title ="What is the evaluation target of the simulation?", fill = "Journal") +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.y = element_blank()) +
    coord_flip()
q15a
```

What is the evaluation target of the simulation?




```
## Q15 Which performance measures were used?
# Spread "Other" apart
# TODO add to the visualization after deciding on treatment of bias
q15_other <- sim_res_fac %>%
  separate_wider_delim(pmother_q15,
                       delim = ",",
```

```
                      names_sep = "_",
                      too_few = "align_start") %>%
  pivot_longer(cols = contains("pmother"),
               names_to = NULL,
               values_to = "pmother",
               values_drop_na = TRUE) %>%
  select(pmother, journal) %>%
  # remove whitespace
  mutate(pmother = str_trim(pmother)) %>%
  mutate(pmother = str_replace(pmother, ".*correlation.*", "correlation")) %>%
  mutate(pmother = str_replace(pmother, ".*standard deviation.*", "standard deviation")) %>%
  mutate(pmother = as.factor(pmother)) %>%
  mutate(pmother = forcats::fct_lump_n(pmother, 3)) %>%
  group_by(journal) %>%
  count(pmother) %>%
  rename(PM = pmother,
         count = n)

# Visualize
q15b <- sim_res_fac %>%
    group_by(journal) %>%
    summarise("Convergence" = sum(pmconvergence_q15 == "yes"),
              "Bias" = sum(pmbias_q15 == "yes"),
              "Empirical SE" = sum(pmempse_q15 == "yes"),
              "(R)MSE" = sum(pm_r_mse_q15 == "yes"),
              "Coverage" = sum(pmcover_q15 == "yes"),
              "Type I error rate" = sum(pmtypeierror_q15 == "yes"),
              "Power" = sum(pmpower_q15 == "yes"),
              "CI width" = sum(pmciwidth_q15 == "yes"),
              "Other" = sum(!is.na(pmother_q15))) %>%
    gather(key = "PM", value = "count", "Convergence", "Bias", "(R)MSE",
           "Empirical SE", "Coverage", "Type I error rate",
           "Power", "CI width", "Other") %>%
    bind_rows(q15_other) %>%
    mutate(PM = as.factor(PM)) %>%
    mutate(PM = reorder(PM, count, sum)) %>%
    ggplot(aes(x = PM, y = count, fill = journal)) +
    geom_bar(stat = "identity") +
    labs(x = NULL, title ="Performance measure", fill = "Journal") +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.y = element_blank()) +
    coord_flip()
q15b
```

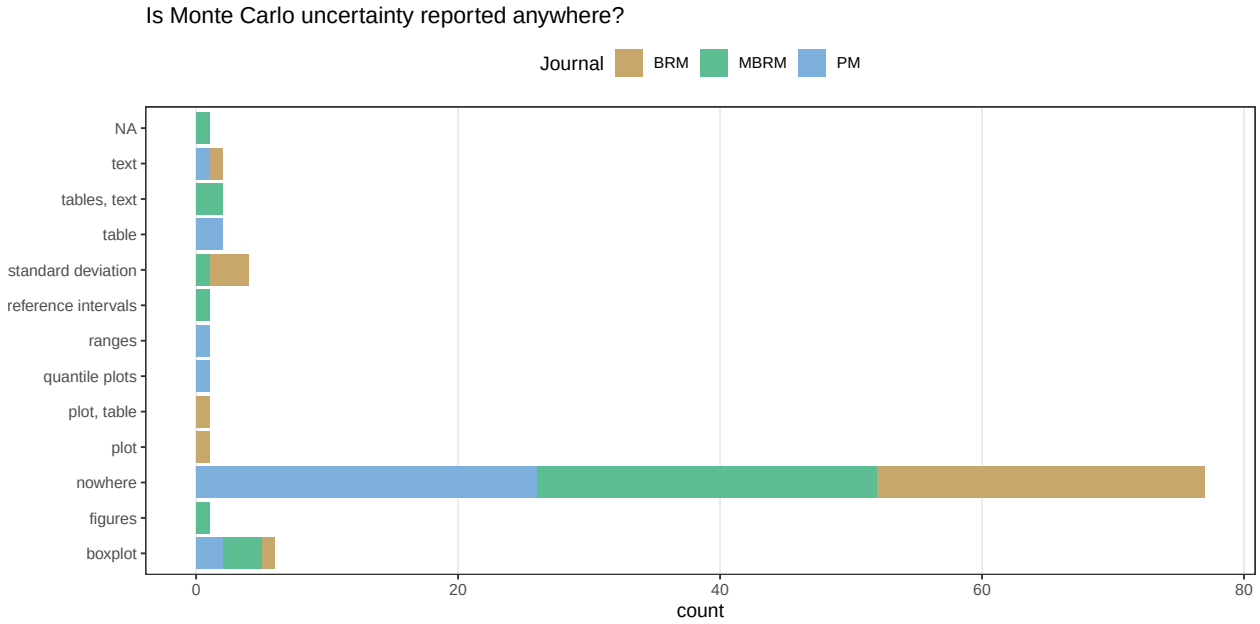



```
# Double check if absolute/relative bias ever occur with bias rated as "no"
sim_res_fac %>%
  separate_wider_delim(pmother_q15,
                       delim = ",",
                       names_sep = "_",
                       too_few = "align_start") %>%
  pivot_longer(cols = contains("pmother"),
               names_to = NULL,
               values_to = "pmother",
               values_drop_na = TRUE) %>%
  mutate(pmother = str_trim(pmother)) %>%
  # mutate(pmother = str_replace(pmother, ".*bias.*", "bias")) %>%
  filter(grepl("bias", pmother)) %>%
  select(reviewer, pmbias_q15, pmother)
```

```
## # A tibble: 18 x 3
##    reviewer pmbias_q15 pmother
##    <fct>    <fct>      <chr>
##  1 FB       yes        absolute bias
##  2 FB       yes        relative bias
##  3 FB       yes        relative bias
##  4 FB       no         absolute bias
##  5 FB       yes        bias of standard errors
##  6 FB       no         relative bias
##  7 FB       yes        relative bias
##  8 FB       no         relative bias
##  9 FB       no         relative bias of standard errors
## 10 FB       no         relative bias
## 11 FB       no         relative bias
## 12 FB       no         relative bias
## 13 FB       no         relative bias of se
## 14 FB       no         relative bias
## 15 FB       no         absolute relative bias
## 16 FB       yes        relative bias of se
```

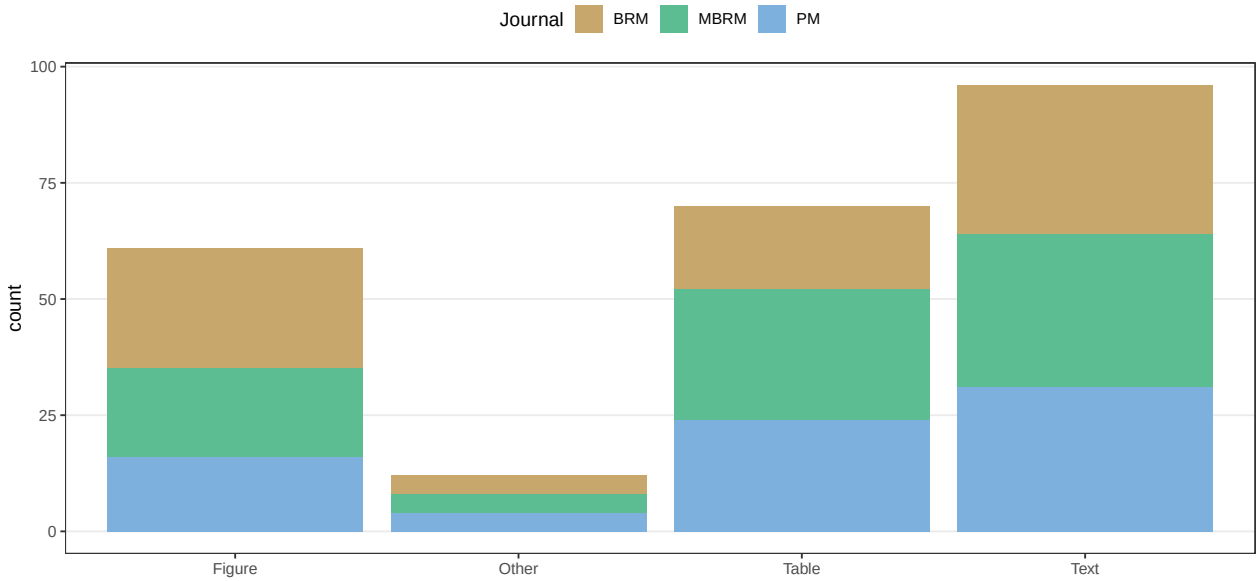
```
## 17 FB       no         relative bias
## 18 BS       yes        SD of SE bias (as uncertainty)
```

```
## Q16 Is Monte Carlo uncertainty reported anywhere?
q16 <- ggplot(data = sim_res_fac, aes(x = mcerrors_q16, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title ="Is Monte Carlo uncertainty reported anywhere?", fill = "Journal") +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.y = element_blank()) +
    coord_flip()
q16
```



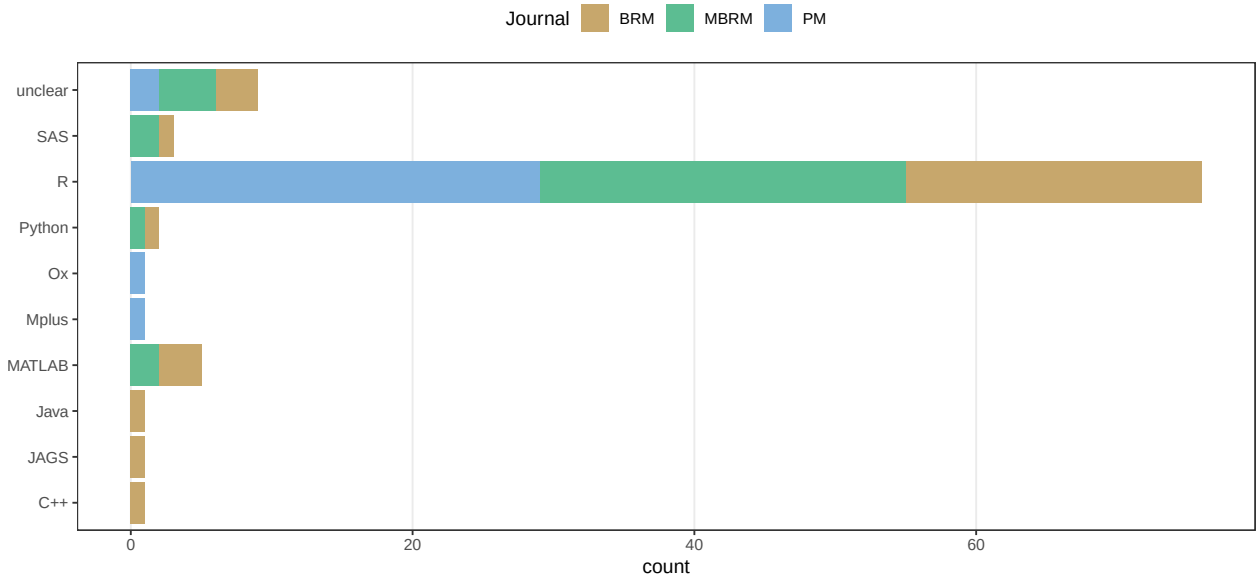

```
## Q17 In which way are the results reported?
q17 <- sim_res_fac %>%
    group_by(journal) %>%
    summarise("Figure" = sum(resultsfigure_q17 == "yes"),
              "Table" = sum(resultstable_q17 == "yes"),
              "Text" = sum(resultstext_q17 == "yes"),
              "Other" = sum(resultsother_q17 == "yes")) %>%
    gather(key = "Type", value = "count", "Figure", "Table", "Text", "Other") %>%
    ggplot(aes(x = Type, y = count, fill = journal)) +
    geom_bar(stat = "identity") +
    labs(x = NULL, title ="In which way are the results reported?", fill = "Journal") +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.x = element_blank())
q17
```

In which way are the results reported?



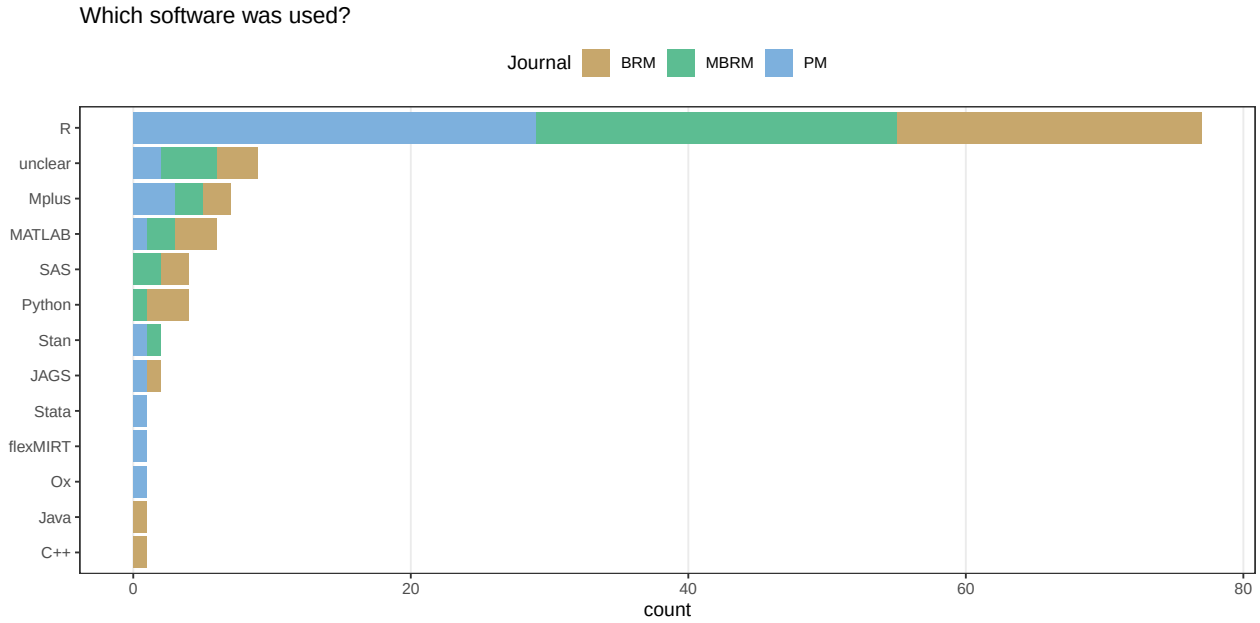

```
## Q18 Which software was used to conduct the simulation?
q18a <- ggplot(data = sim_res_fac, aes(x = software_1_q18, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title ="Which primary software was used?", fill = "Journal") +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.y = element_blank()) +
    coord_flip()
q18a
```

Which primary software was used?



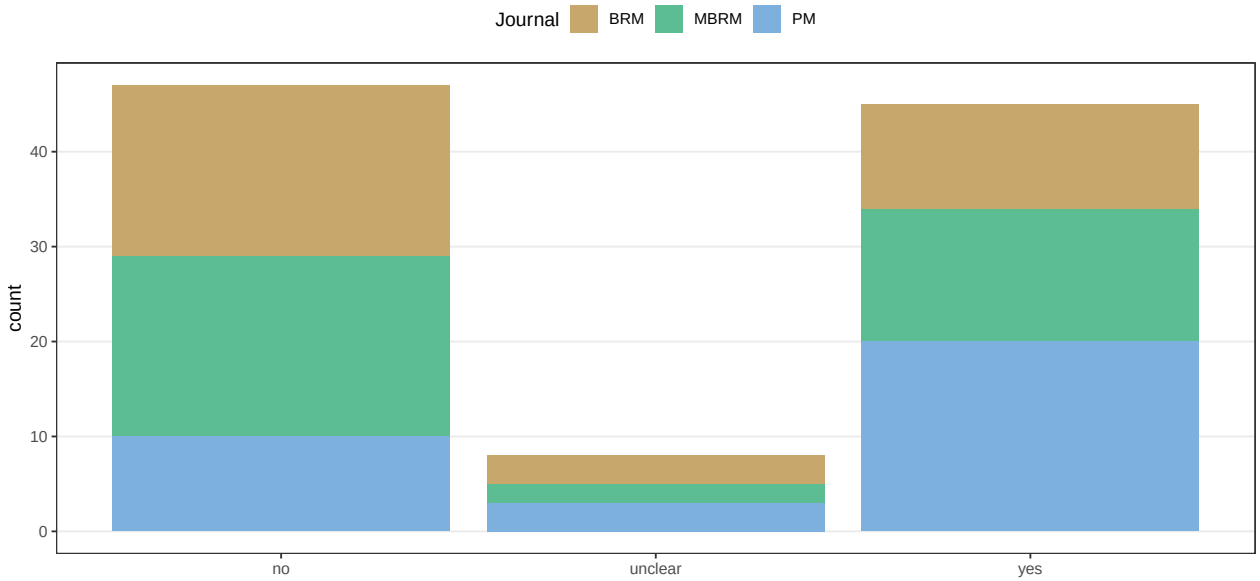

```
# add information from software_2_q18 and software_3_q18
q18b <- sim_res_fac %>%
  select(starts_with("software"), journal) %>%
  pivot_longer(cols = starts_with("software"),
               names_to = NULL,
```

```
                values_to = "software",
                values_drop_na = TRUE) %>%
  mutate(software = as.factor(software)) %>%
  mutate(software = reorder(software, software, length)) %>%
  ggplot(aes(x = software, fill = journal)) +
  geom_bar() +
  labs(x = NULL, title ="Which software was used?", fill = "Journal") +
  scale_fill_discrete_qualitative(palette = pal) +
  theme(panel.grid.major.y = element_blank()) +
  coord_flip()
q18b
```



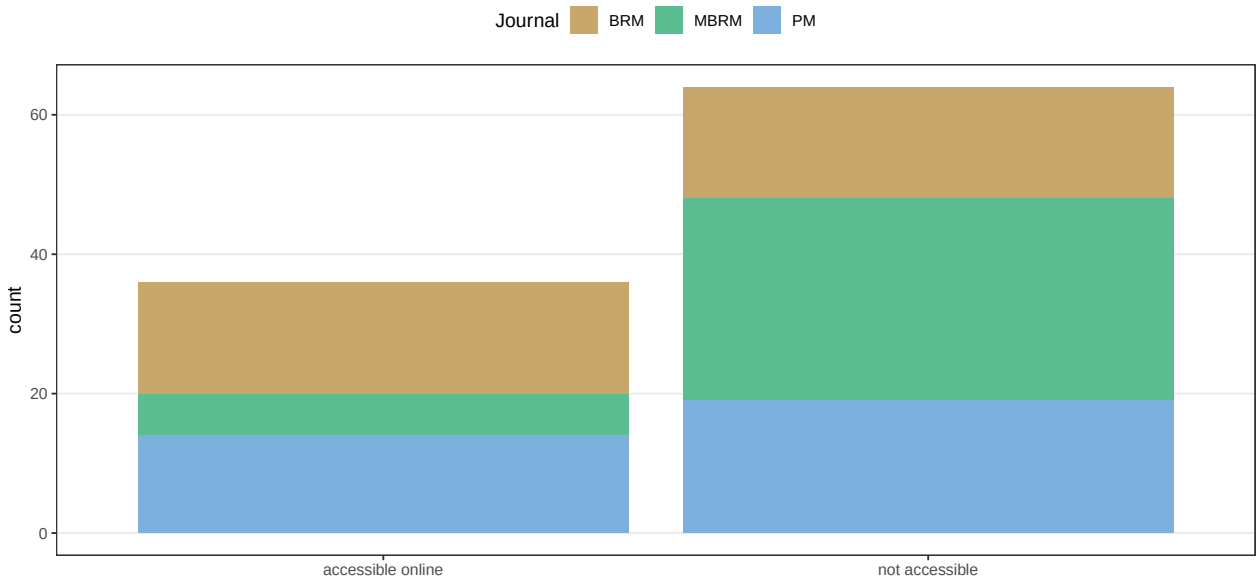

```
## Q19 Are there userwritten commands/packages/macros?
q19 <- ggplot(data = sim_res_fac, aes(x = userwritten_q19, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title ="Are there userwritten commands/packages/macros?", fill = "Journal") +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.x = element_blank())
q19
```

Are there userwritten commands/packages/macros?




```
## Q20 Is code provided?
q20 <- ggplot(data = sim_res_fac, aes(x = codeprovided_q20, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title ="Is code provided?", fill = "Journal") +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.x = element_blank())
q20
```

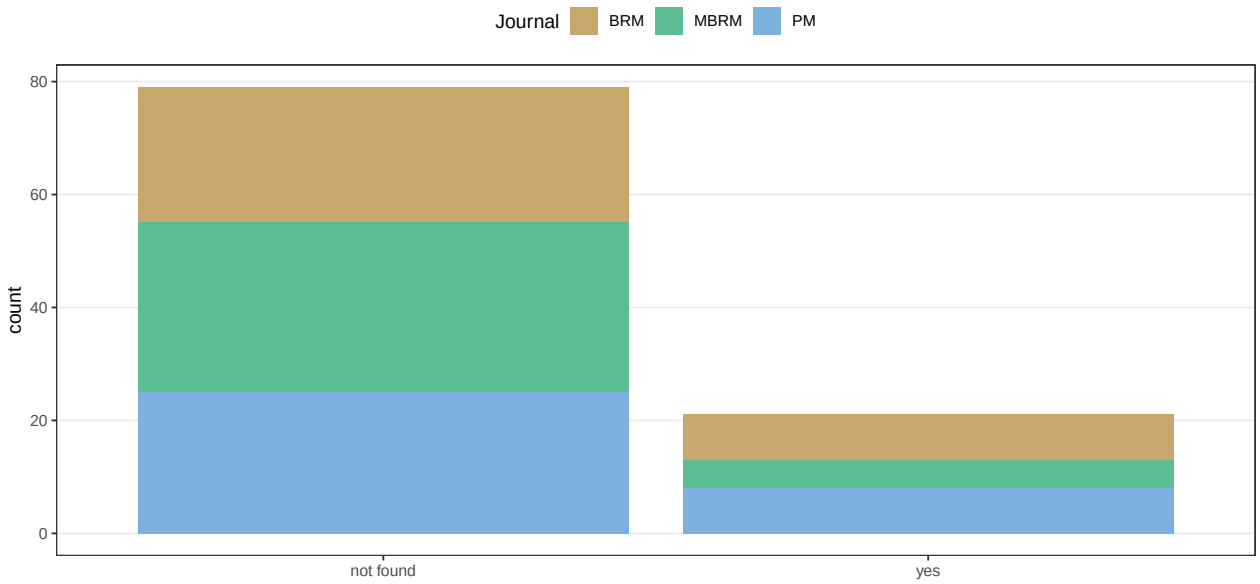
Is code provided?




```
## Q21 If code is provided, is a seed provided?
q21 <- ggplot(data = sim_res_fac, aes(x = seedprovided_q21, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title ="If code is provided, is a seed provided?", fill = "Journal") +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.x = element_blank())
```

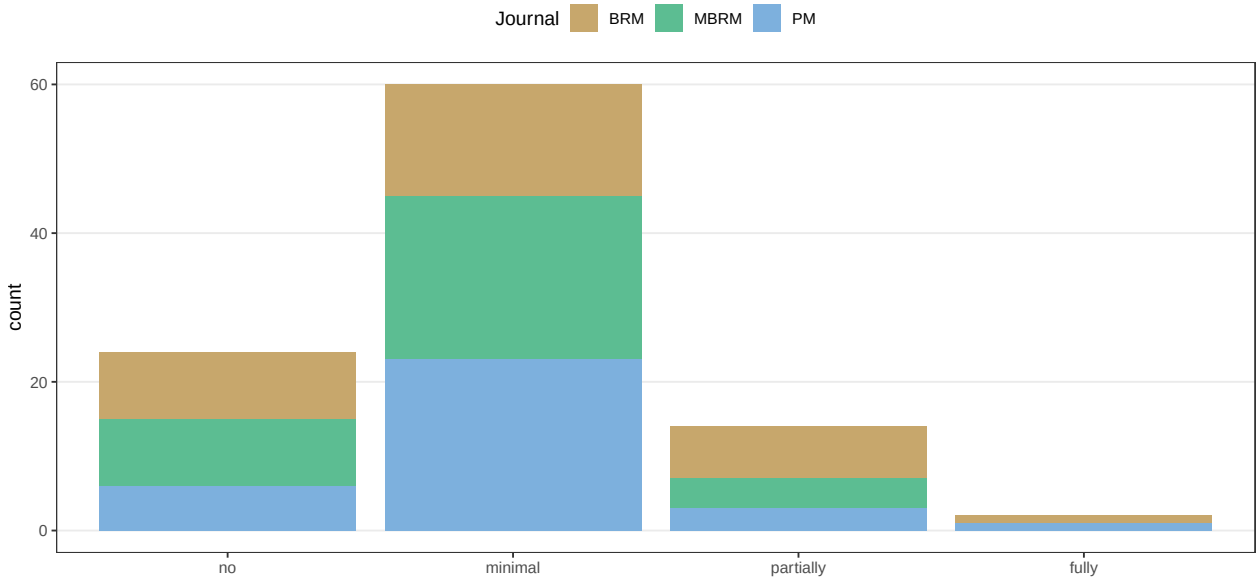
```
q21
```

If code is provided, is a seed provided?

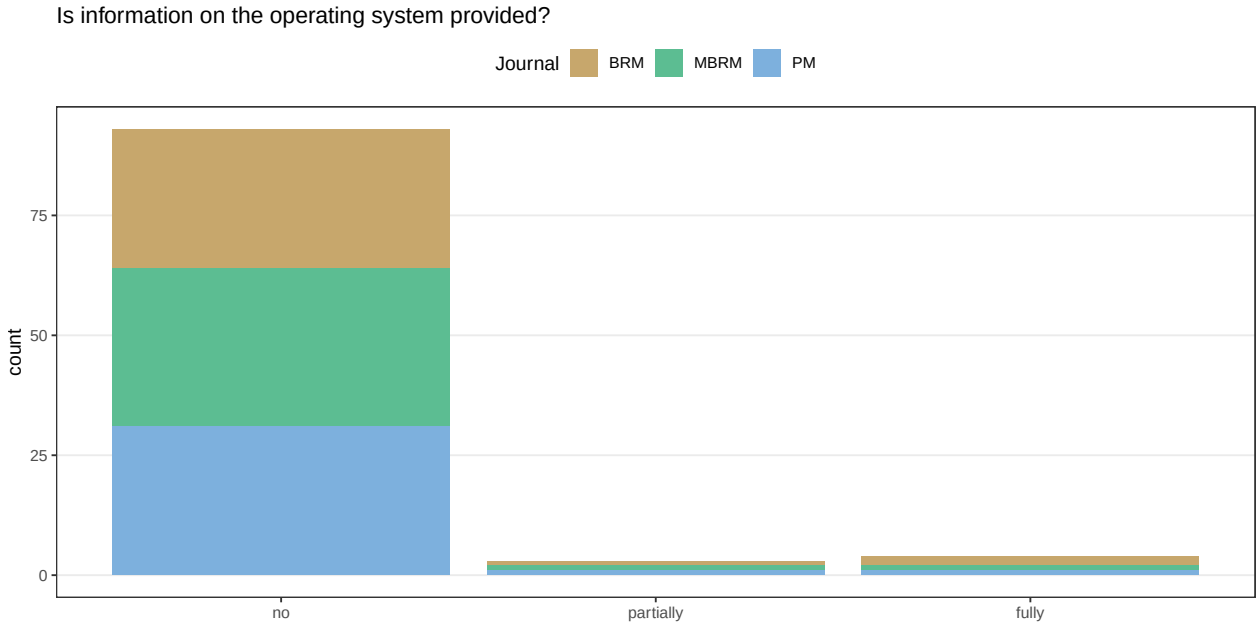



```
## Q22 Is information on the computational environment provided?
q22 <- sim_res_fac %>%
    mutate(compenvironment_q22 = factor(compenvironment_q22,
                                        levels = c("no", "minimal", "partially", "fully"))) %>%
    ggplot(aes(x = compenvironment_q22, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title ="Is information on the computational environment provided?",
         fill = "Journal")  +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.x = element_blank())
q22
```

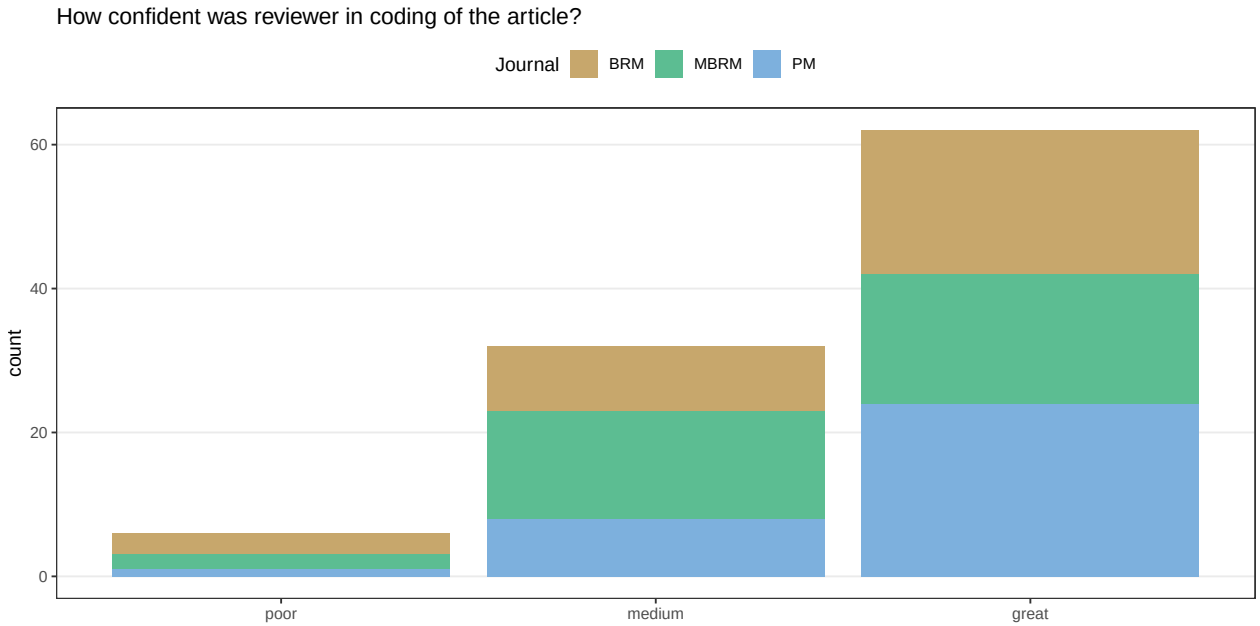
Is information on the computational environment provided?



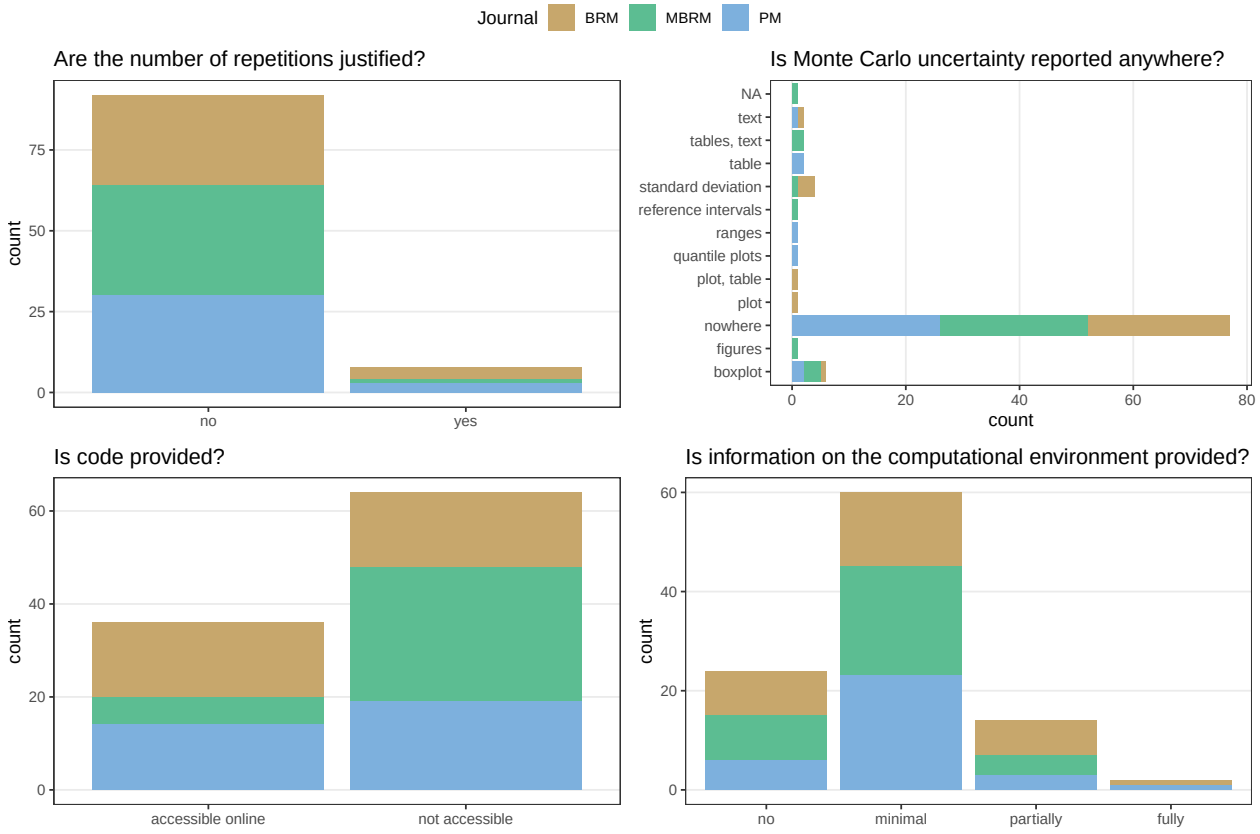
```r
## Q23 Is information on the operating system provided?
q23 <- sim_res_fac %>%
    mutate(compos_q23 = factor(compos_q23,
                               levels = c("no", "partially", "fully"))) %>%
    ggplot(aes(x = compos_q23, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title ="Is information on the operating system provided?",
         fill = "Journal")  +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.x = element_blank())
q23
```




```r
## Q24 How confident was reviewer in coding of the article?
q24 <- sim_res_fac %>%
    mutate(coding_confidence = factor(coding_confidence,
                               levels = c("poor", "medium", "great"))) %>%
    ggplot(aes(x = coding_confidence, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title ="How confident was reviewer in coding of the article?",
         fill = "Journal")  +
    scale_fill_discrete_qualitative(palette = pal) +
    theme(panel.grid.major.x = element_blank())
q24
```



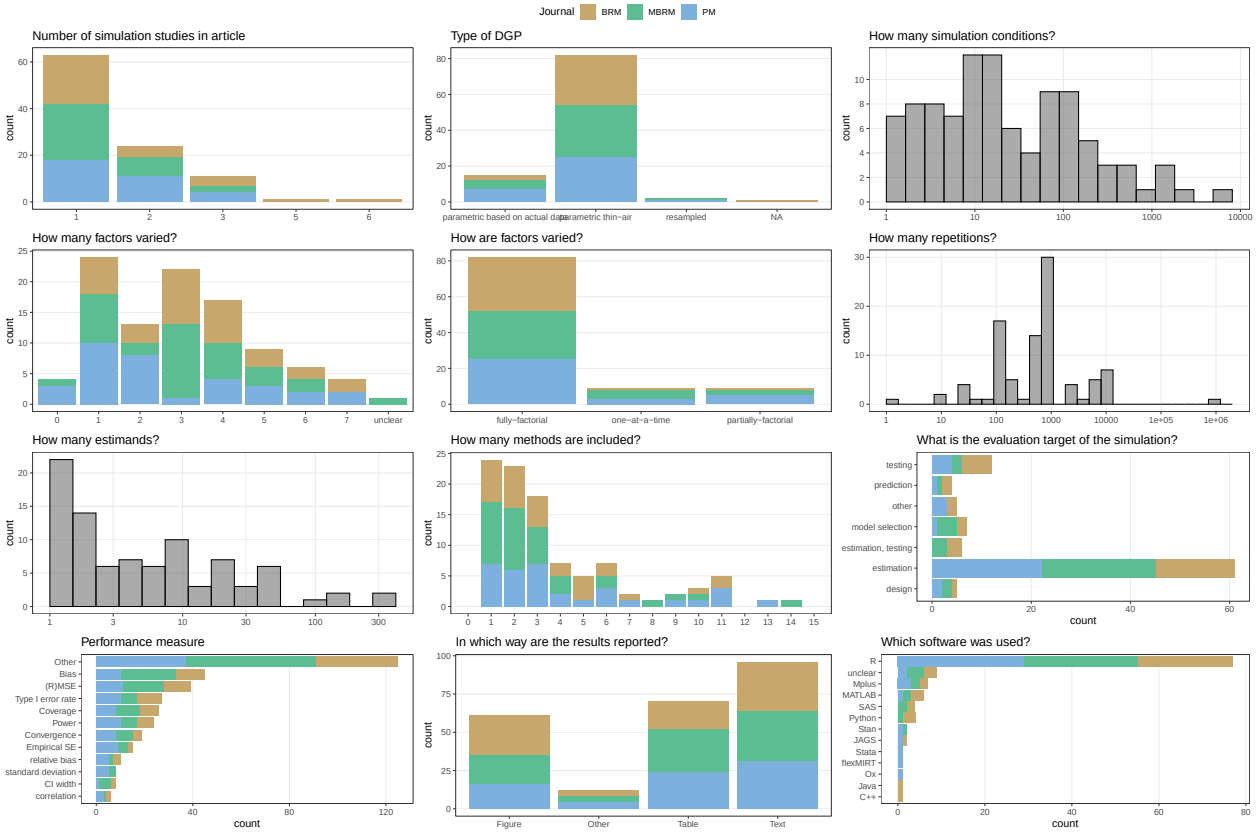

```
## composite plot 1 - problematic questions
ggpubr::ggarrange(q9, q16, q20, q22, ncol = 2, nrow = 2, common.legend = TRUE)
```




```
## composite plot 2 - descriptives
ggpubr::ggarrange(q2, q4, q6, q7a, q7b, q8, q11, q14, q15a, q15b, q17, q18b,
                  ncol = 3, nrow = 4, common.legend = TRUE)
```

```
## Warning: Removed 1 rows containing non-finite values (`stat_bin()`).
```

```
## Warning: Removed 6 rows containing non-finite values (`stat_bin()`).
## Warning: Removed 11 rows containing non-finite values (`stat_bin()`).
## Warning: Removed 1 rows containing non-finite values (`stat_count()`).
```




```
sessionInfo()
```

```
## R version 4.3.1 (2023-06-16)
## Platform: x86_64-pc-linux-gnu (64-bit)
## Running under: Debian GNU/Linux 12 (bookworm)
##
## Matrix products: default
## BLAS:   /usr/lib/x86_64-linux-gnu/openblas-pthread/libblas.so.3
## LAPACK: /usr/lib/x86_64-linux-gnu/openblas-pthread/libopenblasp-r0.3.21.so;  LAPACK version 3.11.0
##
## locale:
##  [1] LC_CTYPE=en_US.UTF-8       LC_NUMERIC=C
##  [3] LC_TIME=en_US.UTF-8        LC_COLLATE=en_US.UTF-8
##  [5] LC_MONETARY=en_US.UTF-8    LC_MESSAGES=en_US.UTF-8
##  [7] LC_PAPER=en_US.UTF-8       LC_NAME=C
##  [9] LC_ADDRESS=C               LC_TELEPHONE=C
## [11] LC_MEASUREMENT=en_US.UTF-8 LC_IDENTIFICATION=C
##
## time zone: Europe/Zurich
## tzcode source: system (glibc)
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets  methods   base
```

```
##
## other attached packages:
## [1] forcats_1.0.0    stringr_1.5.0    ggpubr_0.6.0     colorspace_2.1-0
## [5] ggplot2_3.4.2    tidyr_1.3.0      dplyr_1.1.2
##
## loaded via a namespace (and not attached):
##  [1] gtable_0.3.3     highr_0.10       compiler_4.3.1   ggsignif_0.6.4
##  [5] tinytex_0.45     tidyselect_1.2.0 gridExtra_2.3    scales_1.2.1
##  [9] yaml_2.3.7       fastmap_1.1.1    R6_2.5.1         labeling_0.4.2
## [13] generics_0.1.3   knitr_1.43       backports_1.4.1  tibble_3.2.1
## [17] car_3.1-2        munsell_0.5.0    pillar_1.9.0     rlang_1.1.1
## [21] utf8_1.2.3       broom_1.0.5      stringi_1.7.12   xfun_0.39
## [25] cli_3.6.1        withr_2.5.0      magrittr_2.0.3   digest_0.6.33
## [29] grid_4.3.1       cowplot_1.1.1    lifecycle_1.0.3  vctrs_0.6.3
## [33] rstatix_0.7.2    evaluate_0.21    glue_1.6.2       farver_2.1.1
## [37] abind_1.4-5      carData_3.0-5    fansi_1.0.4      rmarkdown_2.23
## [41] purrr_1.0.1      htmltools_0.5.5  tools_4.3.1      pkgconfig_2.0.3
```