

Preliminary analysis

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Visualizations

Note BS: I changed the font and suggested an alternative color palette in the plot for Q2. Happy to change back if needed.

```
## libraries
library(dplyr)
```

```
##
## Attache Paket: 'dplyr'
```

```
## Die folgenden Objekte sind maskiert von 'package:stats':
##
## filter, lag
```

```
## Die folgenden Objekte sind maskiert von 'package:base':
##
## intersect, setdiff, setequal, union
```

```
library(tidyr)
library(ggplot2)
library(colorspace)
library(ggpubr)
library(stringr)
library(forcats)
library(knitr)
library(kableExtra)
```

```
##
## Attache Paket: 'kableExtra'
```

```
## Das folgende Objekt ist maskiert 'package:dplyr':
##
## group_rows
```

```
library(sysfonts)
library(showtext)
```

```
## Lade nötiges Paket: showtextdb
```

```

# devtools::install_github("kupietyz/kableExtra")

theme_set(theme_bw() +
  theme(legend.position = "top",
        panel.grid.minor = element_blank()))
## pal <- "Harmonic" # change palette here
## ## colorspace::hcl_palettes("qualitative", plot = TRUE)
cols <- c("BRM" = "#E69F00", "MBR" = "#009E73", "PM" = "#0072B2")

# Alternative font
theme_bs <- function(){
  # add google font
  sysfonts::font_add_google("News Cycle", "news")
  # use showtext
  showtext::showtext_auto()
  # theme
  ggplot2::theme_bw(base_family = "news") +
  ggplot2::theme(
    legend.position = "top",
    panel.grid.minor = element_blank(),

    # Title and Axis Texts
    plot.title = ggplot2::element_text(size = ggplot2::rel(1.2), hjust = 0.5),
    plot.subtitle = ggplot2::element_text(size = ggplot2::rel(1.1), hjust = 0.5),
    axis.title = ggplot2::element_text(size = ggplot2::rel(1.15)),
    axis.text = ggplot2::element_text(size = ggplot2::rel(1.1)),
    axis.text.x = ggplot2::element_text(margin = ggplot2::margin(5, b = 10))
  )
}
theme_set(theme_bs())

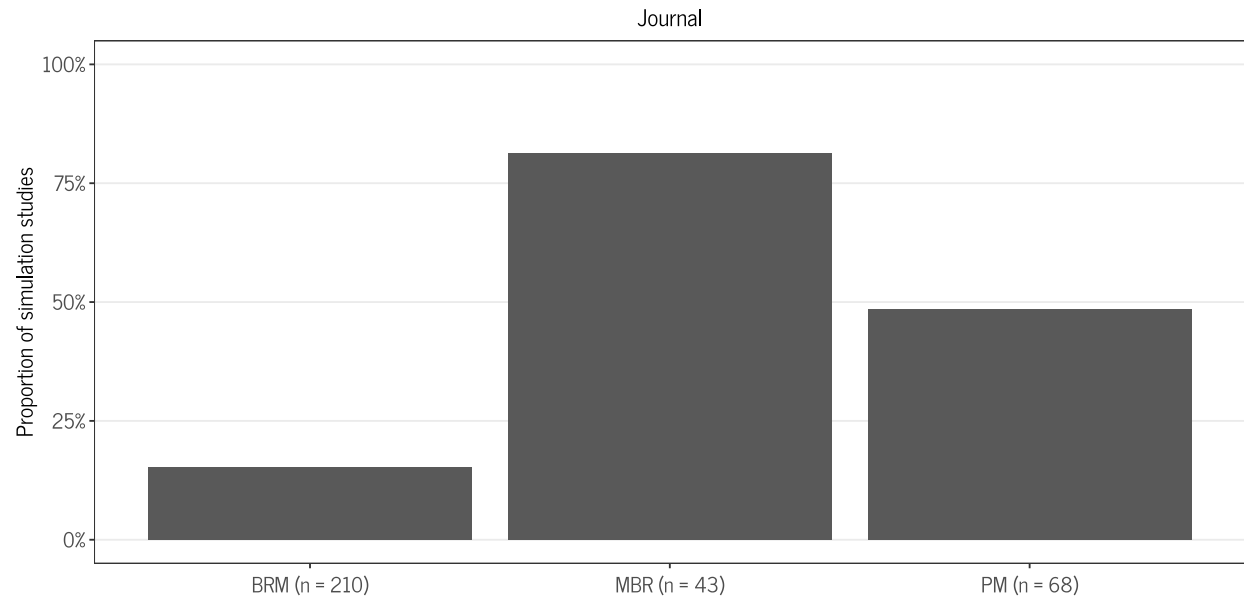
## data
sim_res_fac_full <- readRDS(file = "data/sim_res_fac.RDS")
sim_res_num_full <- readRDS(file = "data/sim_res_num.RDS")

# 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 %>%
  filter(coding_type == "assessment" | is.na(coding_type)) %>%
  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())
```



```
sim_res_fac_full %>%
  filter(coding_type == "assessment" | is.na(coding_type),
         year == 2022) %>%
  summarize(propSim = mean(simstudy_q1 == "yes"),
            sim = sum(simstudy_q1 == "yes"),
            n = n())
```

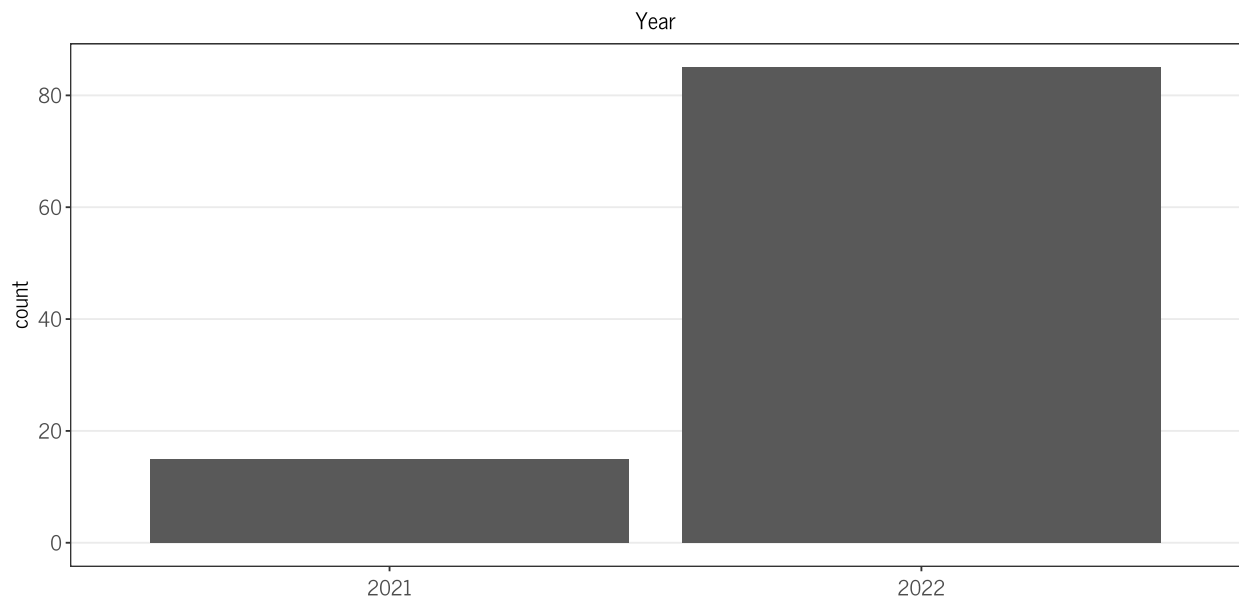
```
## # A tibble: 1 x 3
##   propSim  sim    n
##   <dbl> <int> <int>
## 1  0.343    85   248
```

```
sim_res_fac_full %>%
  filter(coding_type == "assessment" | is.na(coding_type),
         year == 2022) %>%
  group_by(journal) %>%
  summarize(propSim = mean(simstudy_q1 == "yes"),
            sim = sum(simstudy_q1 == "yes"),
            n = n())
```

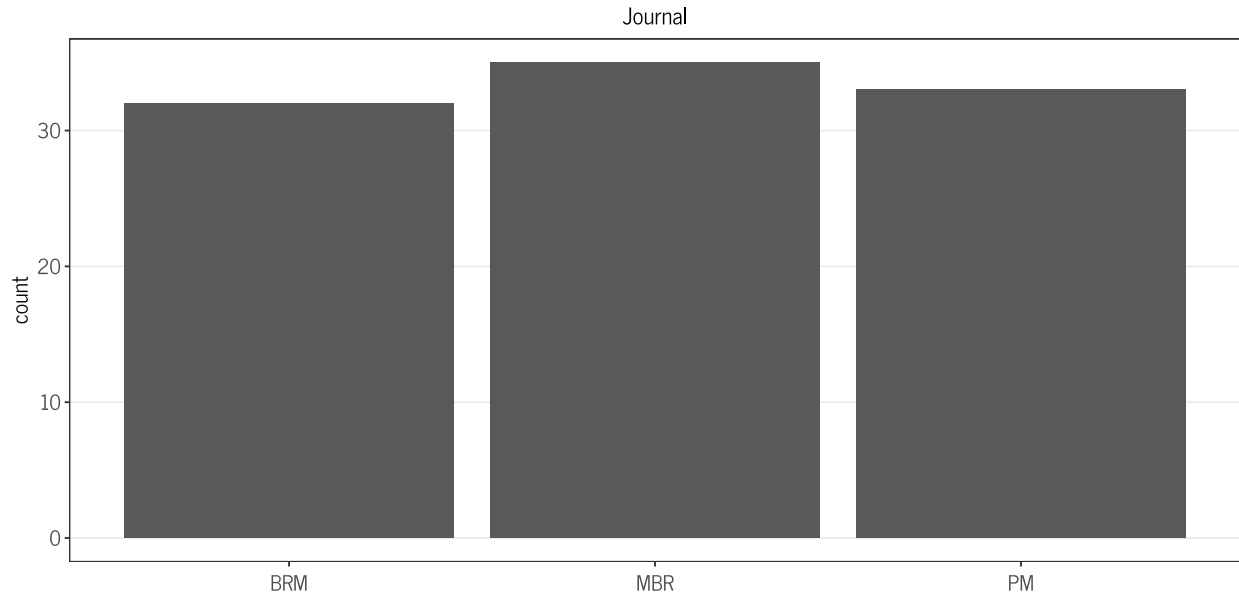
```
## # A tibble: 3 x 4
##   journal propSim  sim    n
##   <fct>    <dbl> <int> <int>
## 1 BRM      0.156    24   154
## 2 MBR      0.814    35    43
## 3 PM       0.510    26    51
```

```
## Morris et al. (2019) find  
## "264 articles of which 199 (75\%) included at least one simulation study"
```

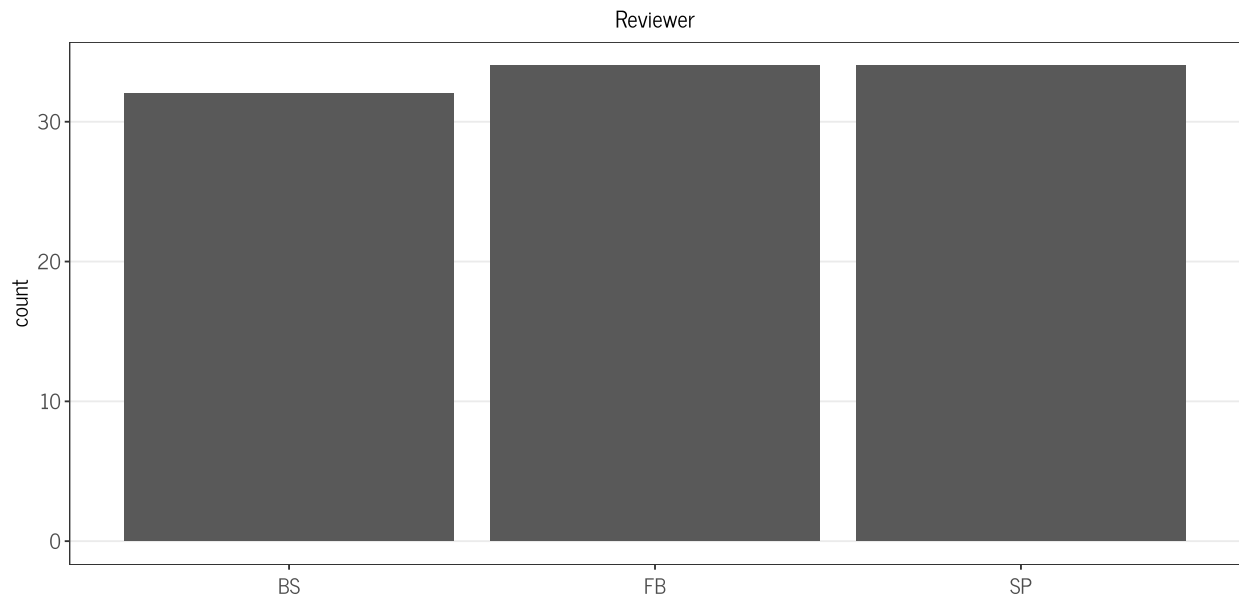
```
## year  
ggplot(data = sim_res_fac, aes(x = factor(year))) +  
  geom_bar() +  
  labs(x = NULL, title = "Year") +  
  theme(panel.grid.major.x = element_blank())
```



```
## 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())
```

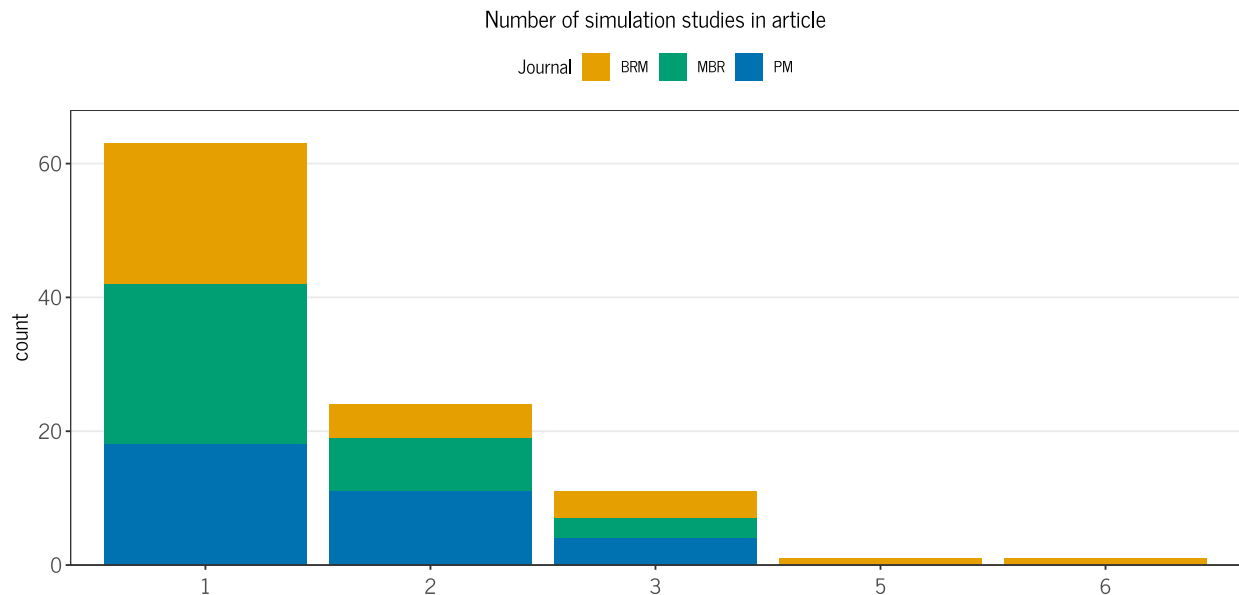


```
## Q2 number of simulation studies
# scale max for plot
q2_plot_max <- max(table(sim_res_fac$nsimstudies_q2)) + 5

q2 <- ggplot(data = sim_res_fac, aes(x = nsimstudies_q2, fill = journal)) +
```

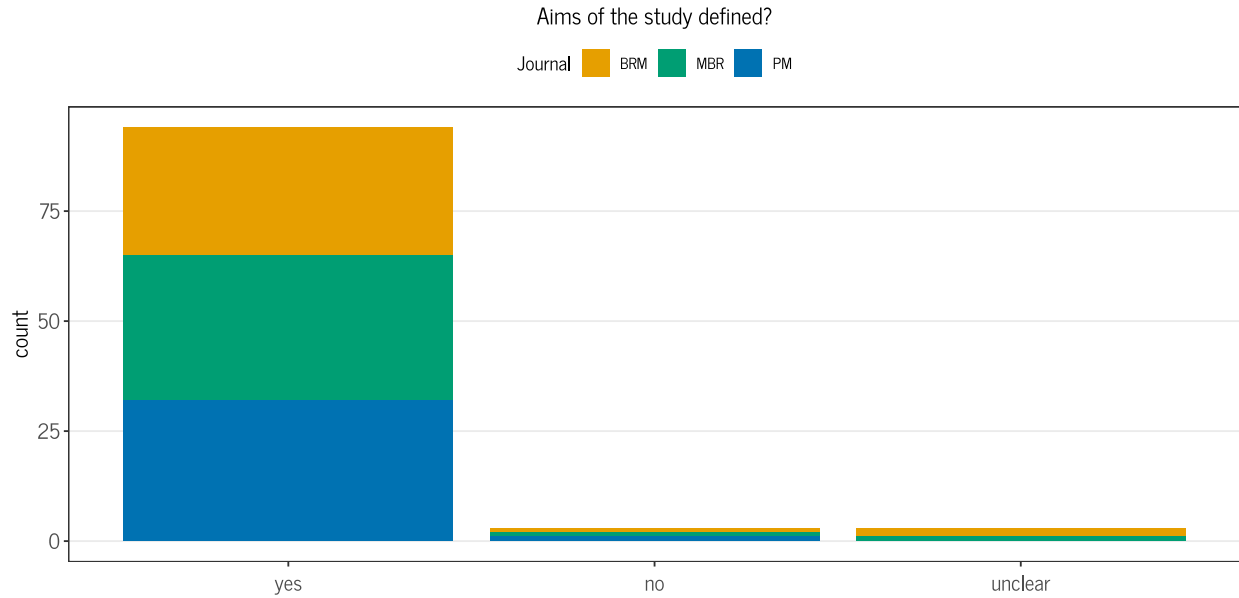
```
geom_bar() +
labs(x = NULL, title = "Number of simulation studies in article", fill = "Journal") +
# scale_fill_discrete_qualitative(palette = pal) +
scale_fill_manual(values = cols) +
scale_y_continuous(limits = c(0, q2_plot_max), expand = c(0,0))+
theme(panel.grid.major.x = element_blank())
```

q2



```
## 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_manual(values = cols) +
  theme(panel.grid.major.x = element_blank())
```

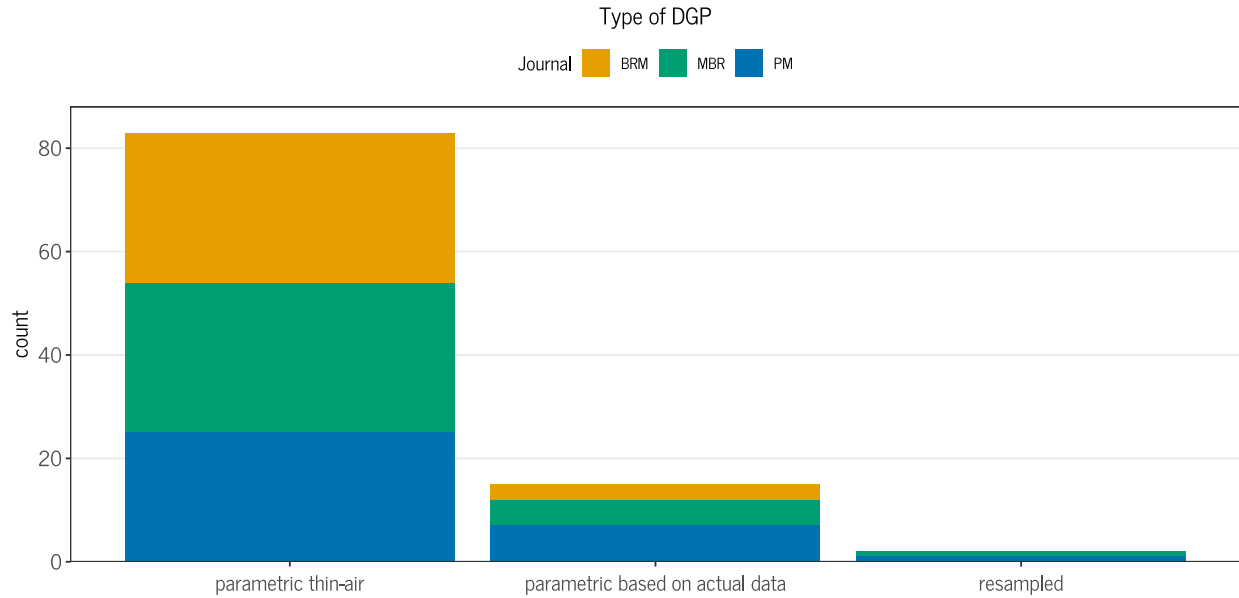
q3



```
## Q4 type of DGP
q4_plot_max <- max(table(sim_res_fac$dgptype_q4)) + 5

q4 <- sim_res_fac %>%
  mutate(dgptype_q4 = as.factor(dgptype_q4)) %>%
  mutate(dgptype_q4 = reorder(dgptype_q4, dgptype_q4, length, decreasing = TRUE)) %>%
  ggplot(aes(x = dgptype_q4, fill = journal)) +
  geom_bar() +
  labs(x = NULL, title = "Type of DGP", fill = "Journal") +
  scale_fill_manual(values = cols) +
  scale_y_continuous(limits = c(0, q4_plot_max), expand = c(0,0)) +
  theme(panel.grid.major.x = element_blank())

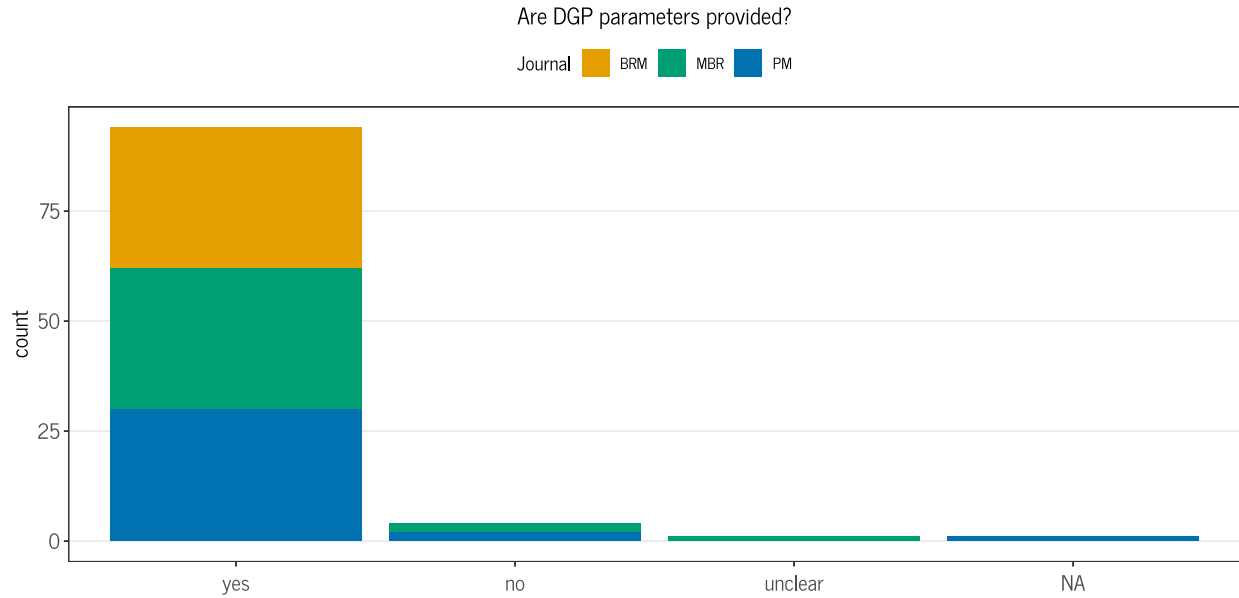
q4
```



from Morris: "97 simulation studies used some form of parametric model to generate data while three used resampling methods. Of the 97 that simulated from a parametric model, 27 based parameter values on data, one based parameter values partly on data, and the remaining 69 on no data. Of these 97, 91 (94\%) provided the parameters used." (p. 2079)

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_manual(values = cols) +
  theme(panel.grid.major.x = element_blank())
q5
```

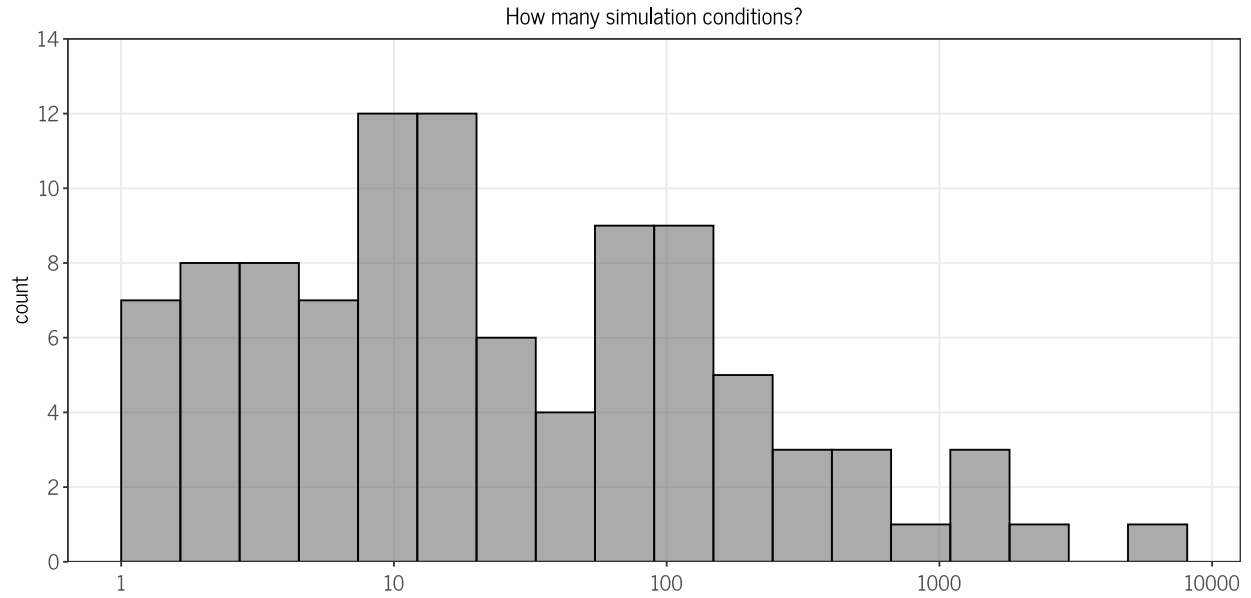
Q6 How many conditions?

```
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
```

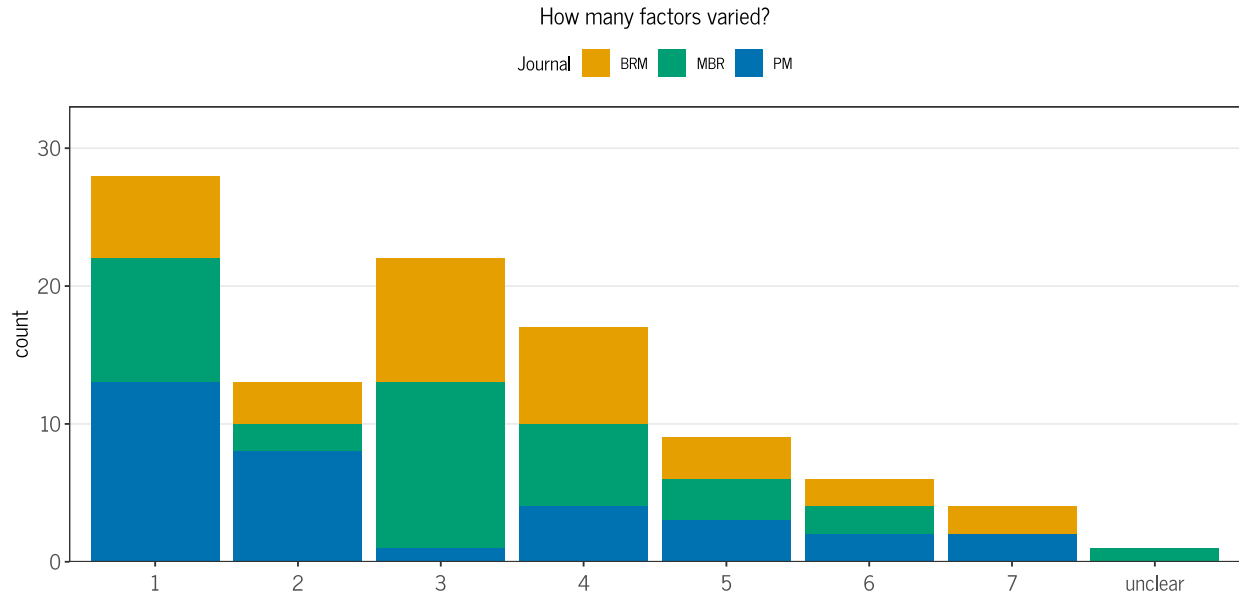
```
breaks <- c(1, 10, 100, 1000, 10000)
q6 <- ggplot(data = sim_res_num, aes(x = log(nconds_q6))) +
  geom_histogram(breaks = seq(0, log(10000), 0.5), col = 1, alpha = 0.5) +
  scale_x_continuous(breaks = log(breaks), labels = breaks) +
  scale_y_continuous(breaks = seq(0, 14, 2), limits = c(0,14), expand = c(0,0)) +
  labs(x = NULL, title = "How many simulation conditions?", fill = "Journal")
q6
```

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



```
## Q7 How many factors?
q7a_plot_max <- max(table(sim_res_fac$factorsvaried_q7)) + 5

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_manual(values = cols) +
  scale_y_continuous(limits = c(0, q7a_plot_max), expand = c(0,0)) +
  theme(panel.grid.major.x = element_blank())
q7a
```

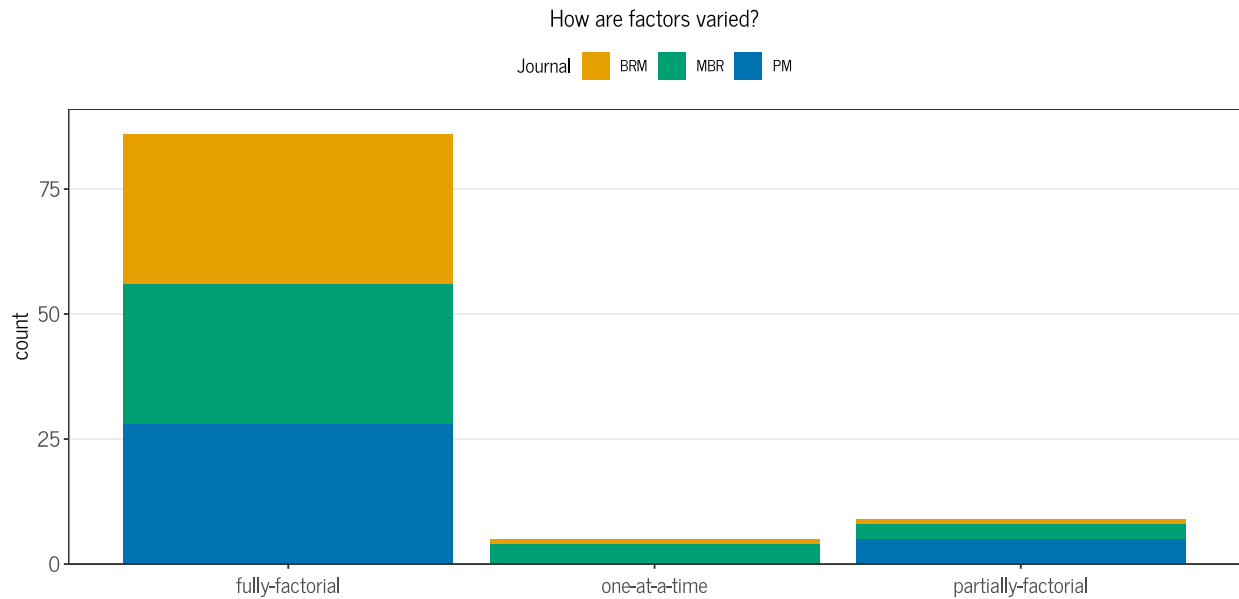


Q7 Fully factorial?

```
q7b_plot_max <- max(table(sim_res_fac$dgmfactorial_q7)) + 5
```

```
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_manual(values = cols) +
  scale_y_continuous(limits = c(0, q7b_plot_max), expand = c(0,0))+
  theme(panel.grid.major.x = element_blank())
```

q7b



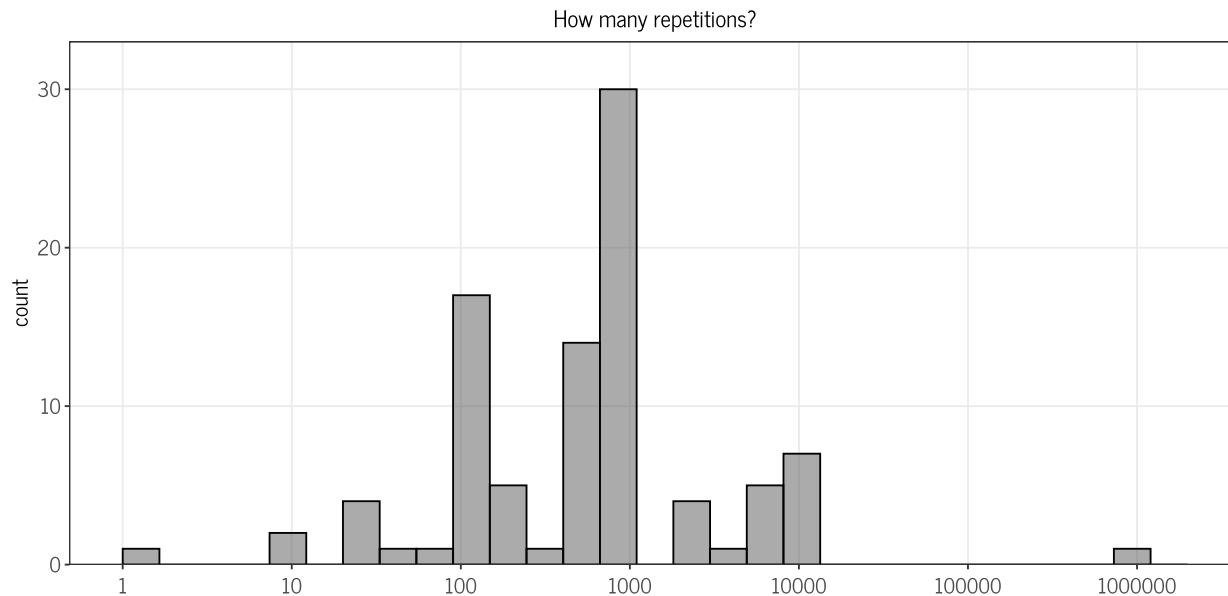
```
## # double check consistency here: how was a single varied factor treated?
## sim_res_fac %>%
##   filter(factorsvaried_q7 == 1) %>%
##   select(reviewer, factorsvaried_q7, dgmfactorial_q7) %>%
##   View()
```

```
## 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)
labs <- 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 = labs) +
  scale_y_continuous(limits = c(0,33), expand = c(0,0))
q8
```

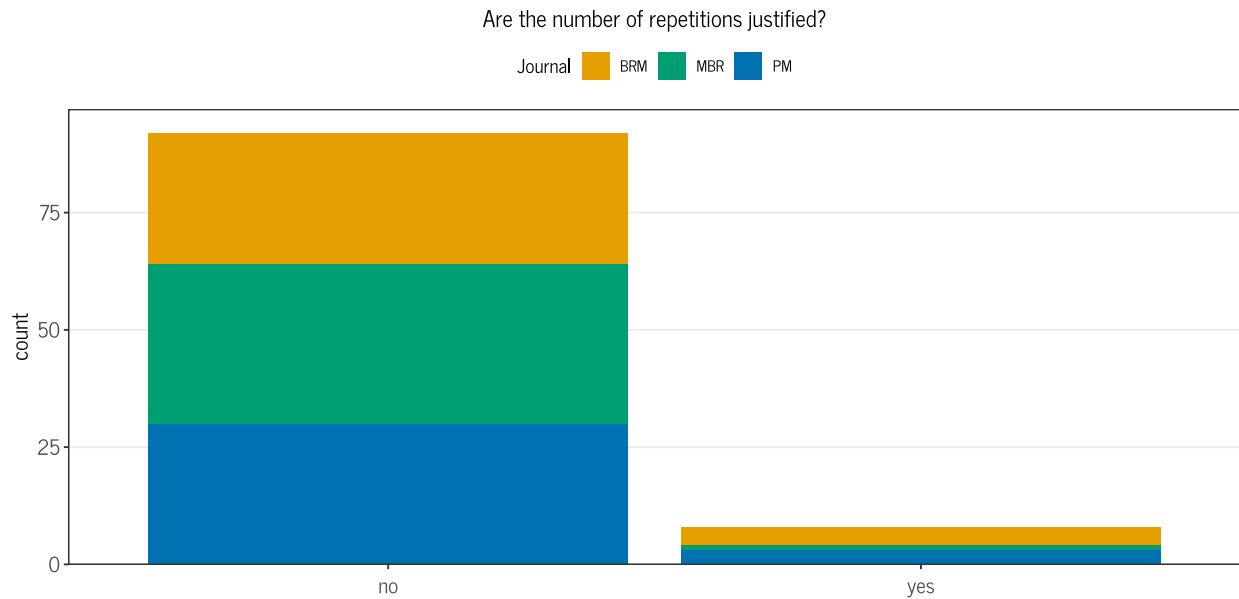
```
## Warning: Removed 6 rows containing non-finite values ('stat_bin()').
```



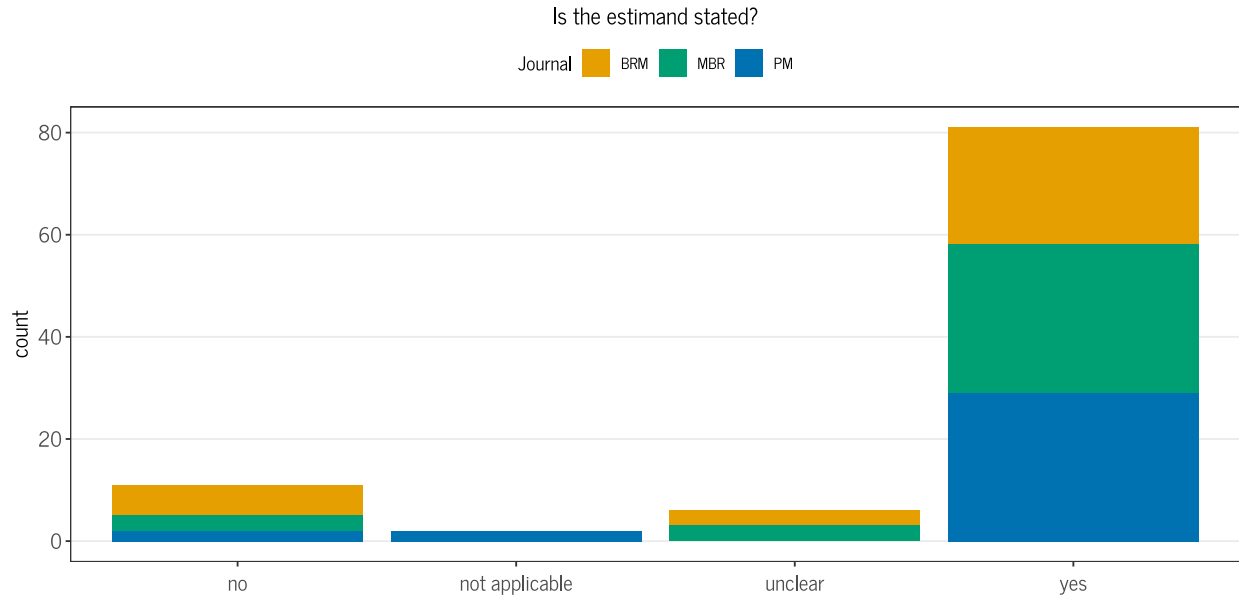
```
## Q9 Are the number of repetitions justified?
q9_plot_max <- max(table(sim_res_fac$nsimjustified_q9)) + 5

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_manual(values = cols) +
scale_y_continuous(limits = c(0, q9_plot_max), expand = c(0,0)) +
theme(panel.grid.major.x = element_blank())
q9
```



```
## 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_manual(values = cols) +
  theme(panel.grid.major.x = element_blank())
q10
```



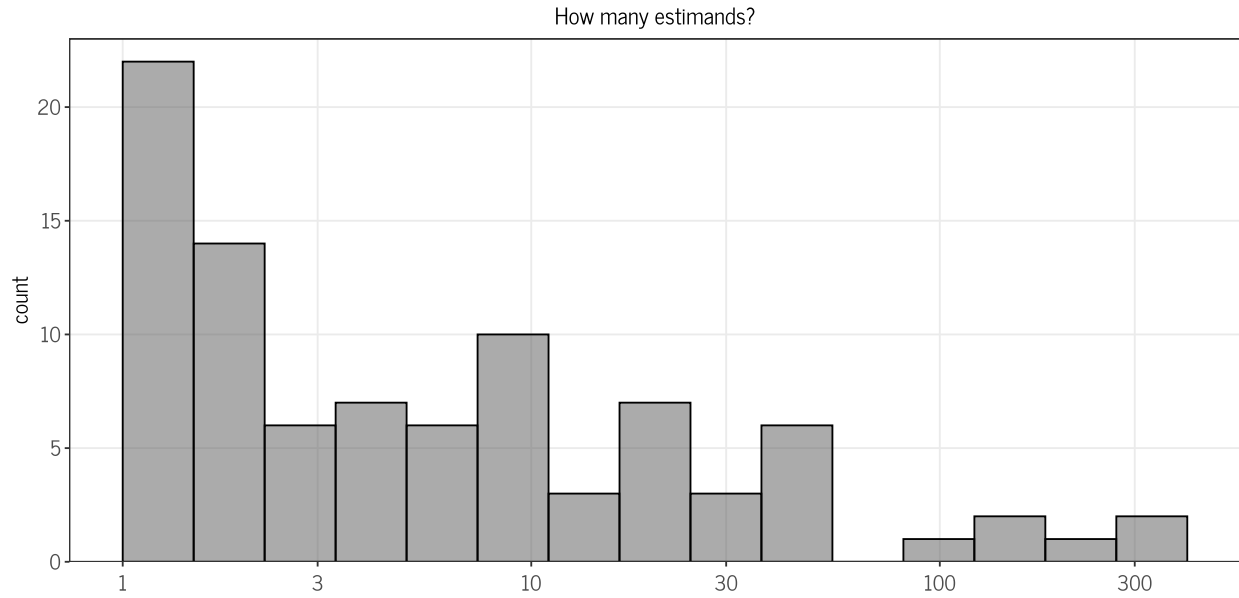
Q11 How many estimands?

```
summary(sim_res_num$nestimands_q11)
```

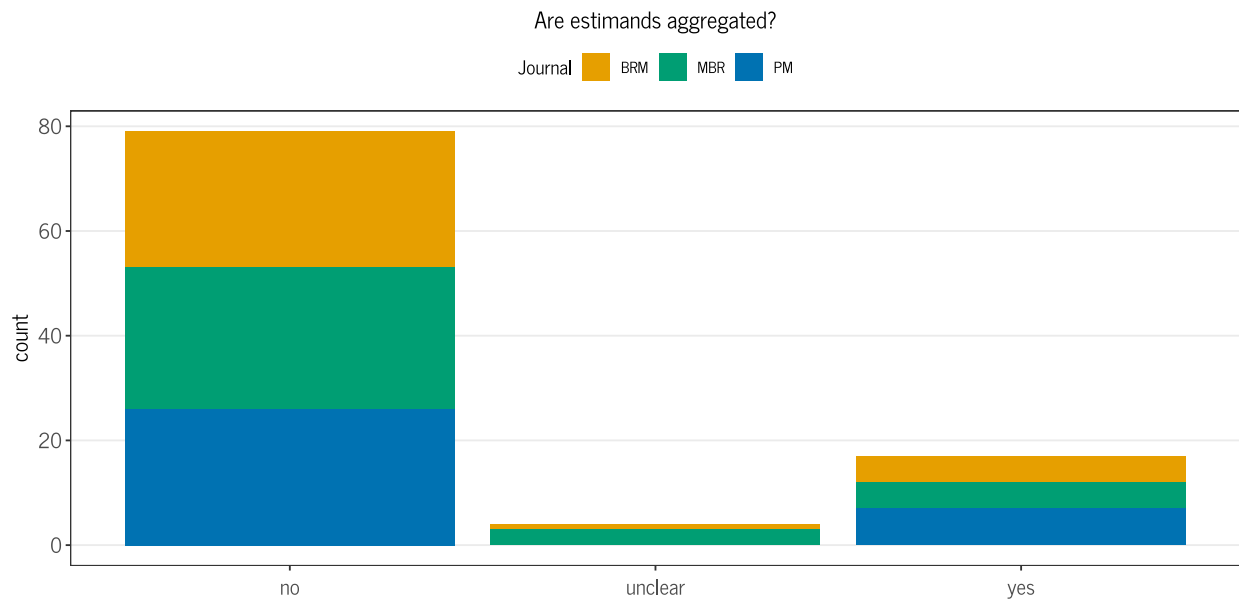
```
##      Min. 1st Qu.  Median    Mean 3rd Qu.    Max.     NA's
##         1         2         4      22     15     384        10
```

```
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) +
  scale_y_continuous(limits = c(0, 23), expand = c(0,0)) +
  labs(x = NULL, title = "How many estimands?", fill = "Journal")
q11
```

Warning: Removed 10 rows containing non-finite values ('stat_bin()').



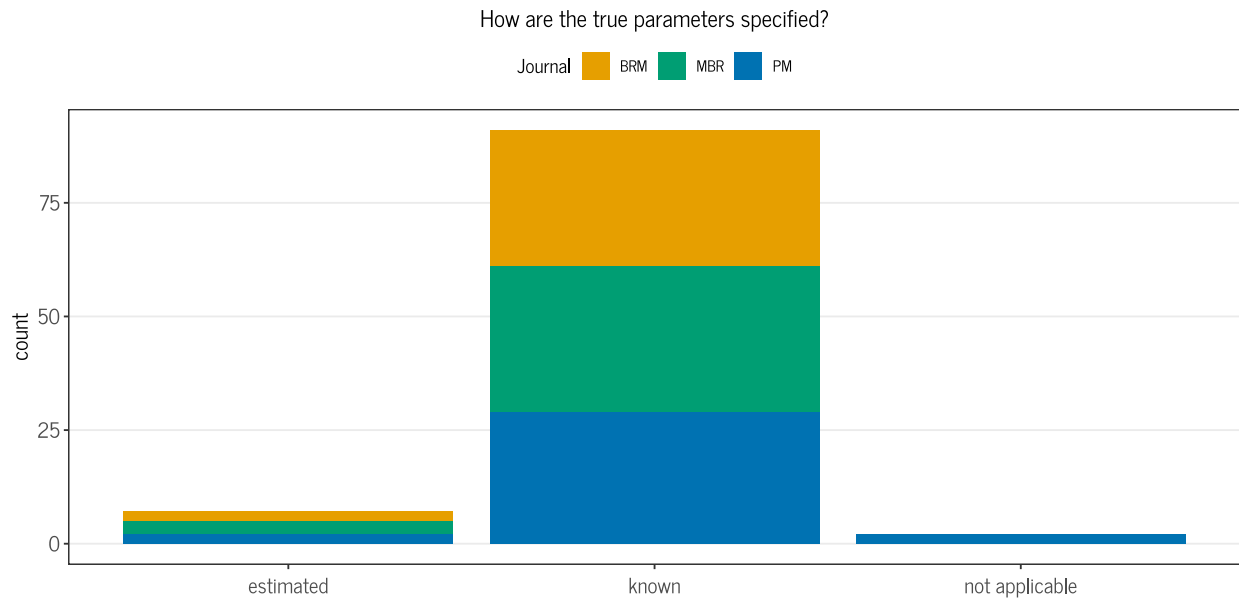
```
## Q12 Are estimands aggregated?
q12 <- ggplot(data = sim_res_fac, aes(x = estimandsagg_q12, fill = journal)) +
  geom_bar() +
  labs(x = NULL, title = "Are estimands aggregated?", fill = "Journal") +
  scale_fill_manual(values = cols) +
  theme(panel.grid.major.x = element_blank())
q12
```



```
## 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_manual(values = cols) +
theme(panel.grid.major.x = element_blank())
```

q13



Q14 How many methods are included?

```
summary(sim_res_num$nmethos_q14)
```

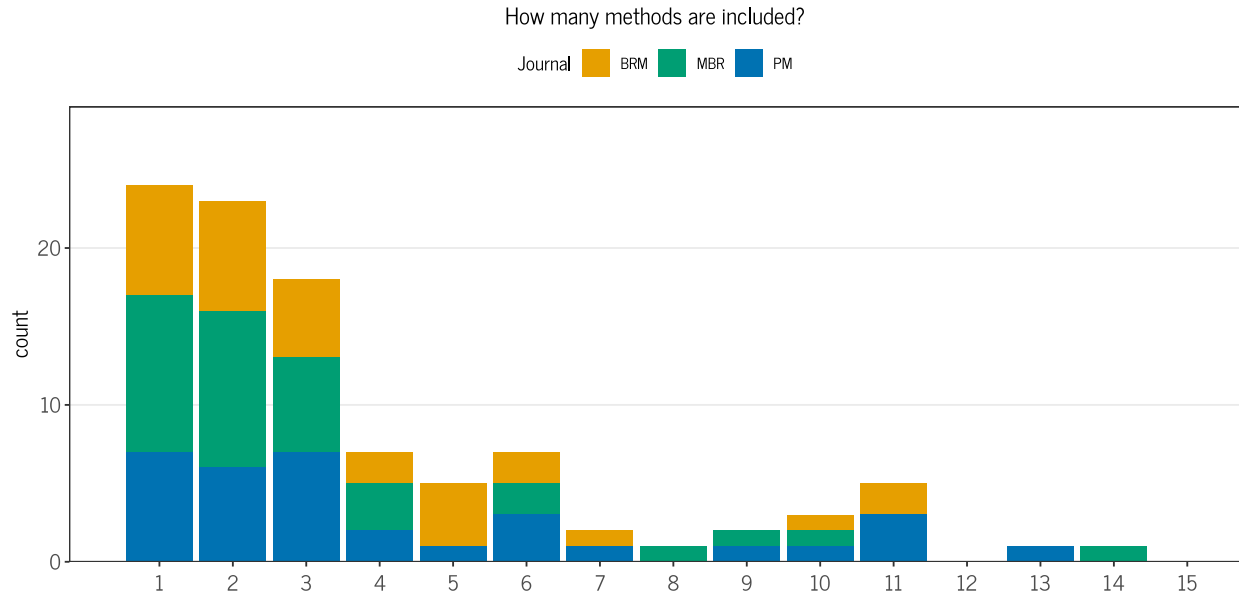
```
##      Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##      1.00   2.00   3.00   5.63   5.00  192.00
```

```
q14_plot_max <- max(table(sim_res_fac$nmethos_q14)) + 5
```

```
# HACK there is one study with 192 methods, let's exclude it for a moment
q14 <- ggplot(data = sim_res_num, aes(x = nmethos_q14, fill = journal)) +
  geom_bar() +
  scale_x_continuous(breaks = seq(1, 15), limits = c(0.5, 15)) +
  labs(x = NULL, title = "How many methods are included?", fill = "Journal") +
  scale_fill_manual(values = cols) +
  scale_y_continuous(limits = c(0, q14_plot_max), expand = c(0,0))+
  theme(panel.grid.major.x = element_blank())
```

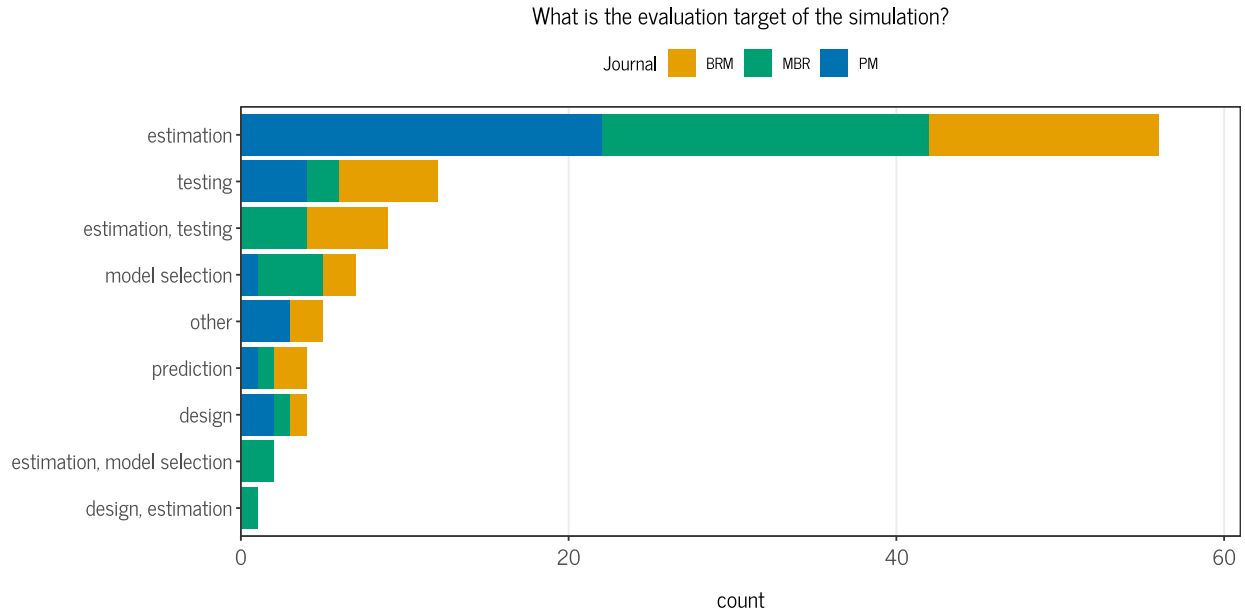
q14

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

```
## Q15 What is the evaluation target of the simulation?
q15_plot_max <- max(table(sim_res_fac$target_q15)) + 5

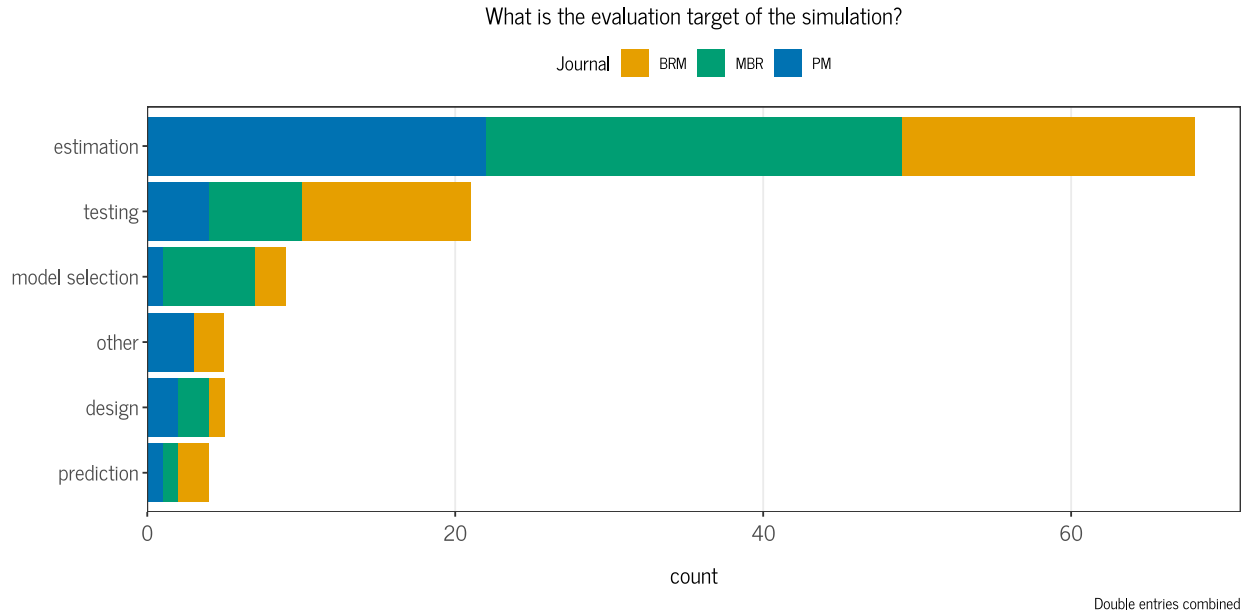
q15a <- sim_res_fac %>%
  mutate(target_q15 = as.factor(target_q15)) %>%
  mutate(target_q15 = reorder(target_q15, target_q15, length)) %>%
  ggplot(aes(x = target_q15, fill = journal)) +
  geom_bar() +
  labs(x = NULL, title = "What is the evaluation target of the simulation?", fill = "Journal") +
  scale_fill_manual(values = cols) +
  scale_y_continuous(limits = c(0, q15_plot_max), expand = c(0,0))+
  theme(panel.grid.major.y = element_blank()) +
  coord_flip()
q15a
```



to keep it consistent with other questions, also spread apart results here

```
q15a_new <- sim_res_fac %>%
  separate_wider_delim(target_q15,
    delim = ",",
    names_sep = "_",
    too_few = "align_start") %>%
  pivot_longer(cols = contains("target"),
    names_to = NULL,
    values_to = "target",
    values_drop_na = TRUE) %>%
  mutate(target = str_trim(target)) %>%
  mutate(target = as.factor(target)) %>%
  mutate(target = reorder(target, target, length)) %>%
  ggplot(aes(x = target, fill = journal)) +
  geom_bar() +
  labs(x = NULL, title = "What is the evaluation target of the simulation?",
    fill = "Journal", caption = "Double entries combined") +
  scale_fill_manual(values = cols) +
  scale_y_continuous(limits = c(0, q15_plot_max + 10), expand = c(0,0)) +
  theme(panel.grid.major.y = element_blank()) +
  coord_flip()
```

q15a_new



```
## Q15 Which performance measures were used?
# Spread "Other" apart
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 = str_replace(pmother, ".*bias.*", "Bias")) %>%
  mutate(pmother = as.factor(pmother)) %>%
  mutate(pmother = forcats::fct_lump_n(pmother, 3)) %>%
  group_by(journal) %>%
  count(pmother) %>%
  rename(PM = pmother,
    count = n)

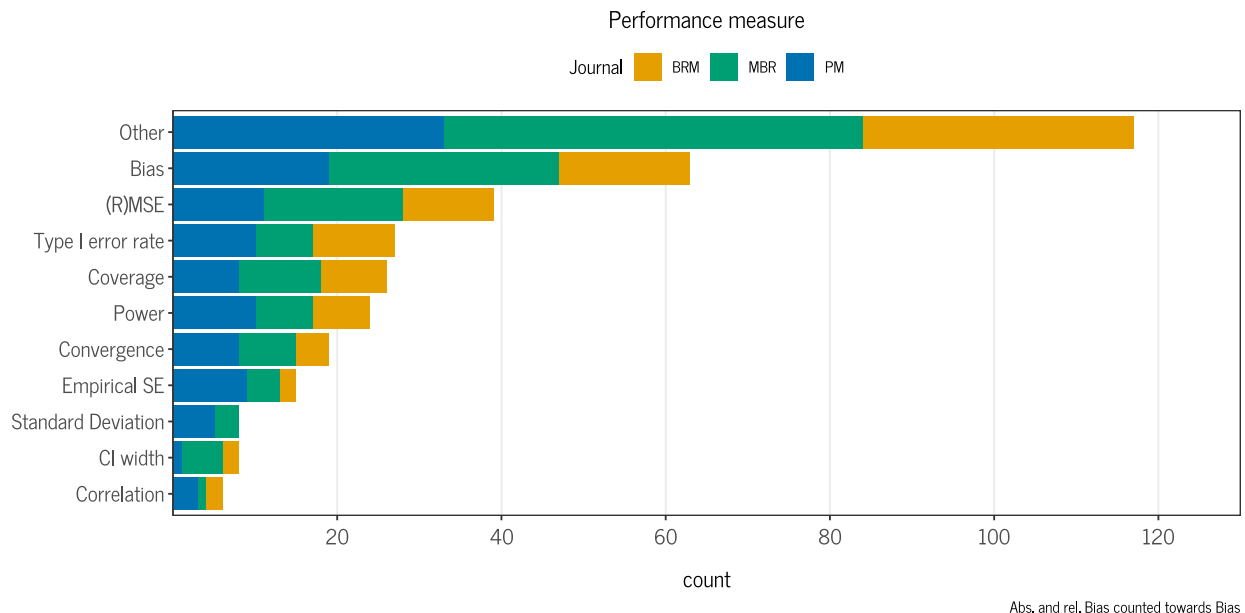
# Visualize
q15b <- sim_res_fac %>%
  group_by(journal) %>%
  summarise("Convergence" = sum(pmconvergence_q15 == "yes"),
    "Bias" = sum(pmbias_q15 == "yes"),
    "Empirical SE" = sum(pmempse_q15 == "yes"),
    "(R)MSE" = sum(pm_r_mse_q15 == "yes"),
    "Coverage" = sum(pmcover_q15 == "yes"),
    "Type 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",
     caption = "Abs. and rel. Bias counted towards Bias") +
scale_fill_manual(values = cols) +
scale_y_continuous(limits = c(0,130), expand = c(0,0),
                   breaks = c(20, 40, 60, 80, 100, 120))+
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)

```

```

# What is included in "Standard Deviation"?
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("standard deviation", pmother)) %>%
  select(pmother)

```

```

## # A tibble: 8 x 1
##   pmother
##   <chr>
## 1 means and standard deviations of the estimates
## 2 efficiency (standard deviation of estimates)
## 3 standard deviations
## 4 standard deviations
## 5 standard deviation
## 6 efficiency (standard deviation of estimates)

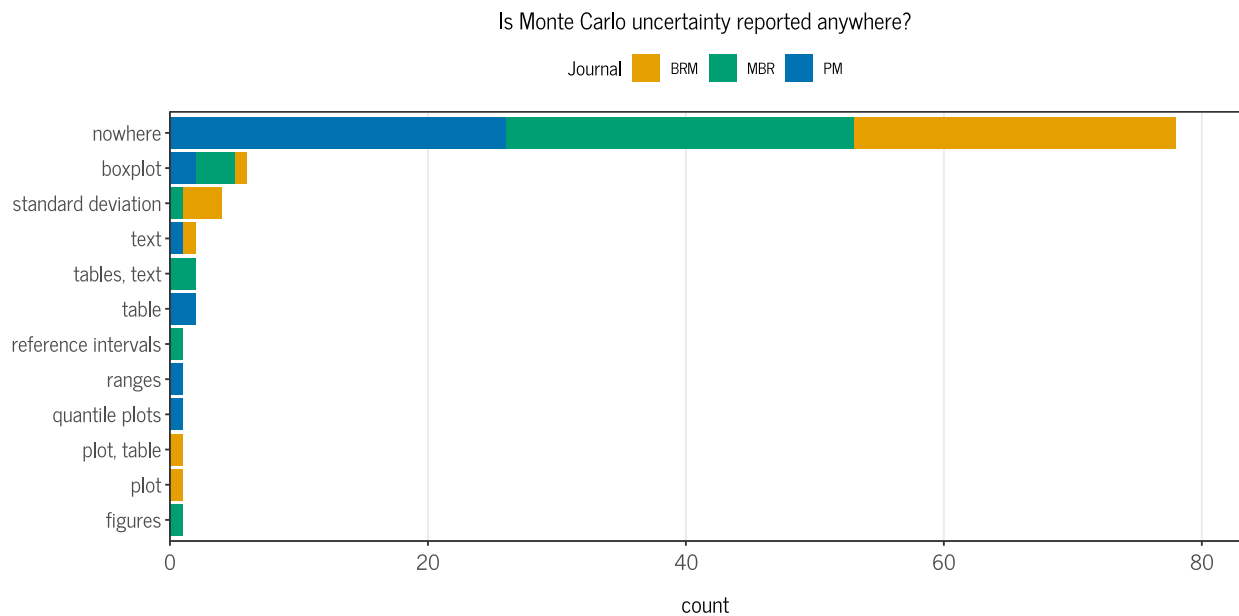
```

```
## 7 standard deviation
## 8 standard deviation over aggregated estimates
```

```
## Q16 Is Monte Carlo uncertainty reported anywhere?
```

```
q16_plot_max <- max(table(sim_res_fac$merrors_q16)) + 5
```

```
q16 <- sim_res_fac %>%
  mutate(merrors_q16 = as.factor(merrors_q16)) %>%
  mutate(merrors_q16 = reorder(merrors_q16, merrors_q16, length)) %>%
  ggplot(aes(x = merrors_q16, fill = journal)) +
    geom_bar() +
    labs(x = NULL, title = "Is Monte Carlo uncertainty reported anywhere?", fill = "Journal") +
    scale_fill_manual(values = cols) +
    theme(panel.grid.major.y = element_blank()) +
    scale_y_continuous(limits = c(0, q16_plot_max), expand = c(0,0)) +
    coord_flip()
q16
```

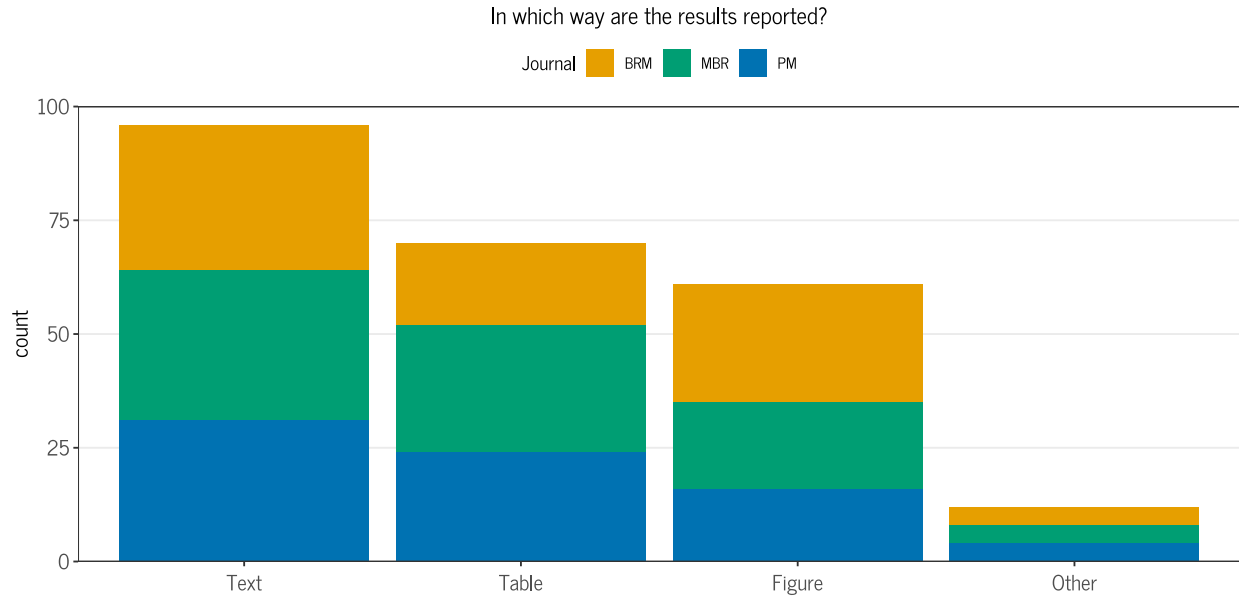


```
## Q17 In which way are the results reported?
```

```
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") %>%
  mutate(Type = as.factor(Type)) %>%
  mutate(Type = reorder(Type, count, sum, decreasing = TRUE)) %>%
  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_manual(values = cols) +
```

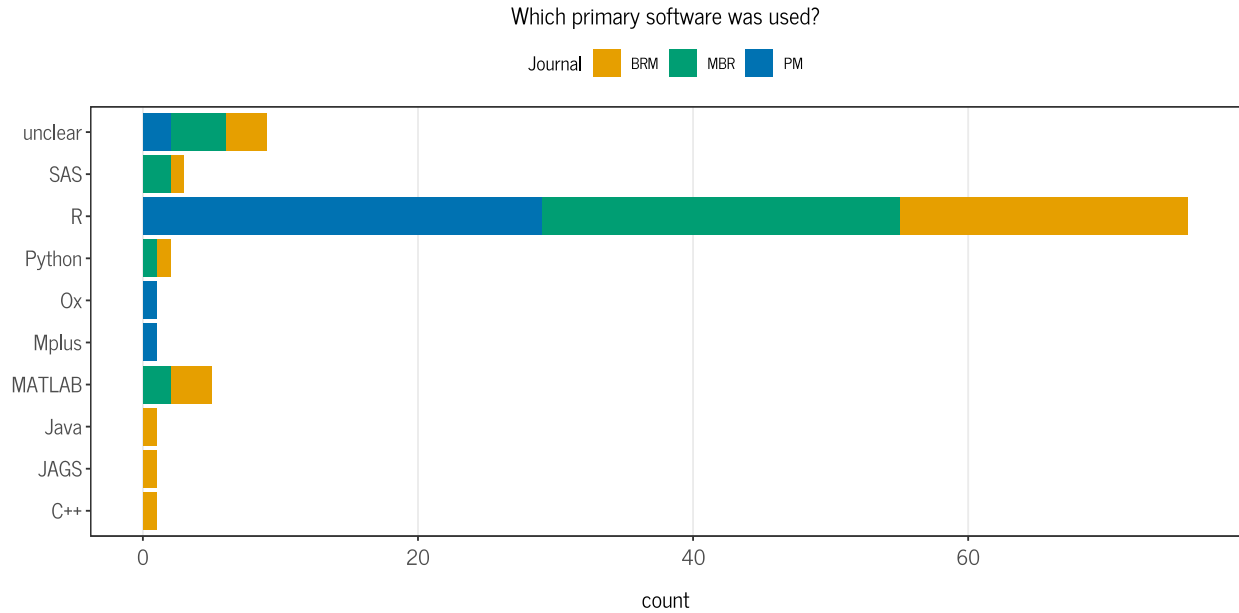
```
scale_y_continuous(limits = c(0,100), expand = c(0,0))+
theme(panel.grid.major.x = element_blank())
```

q17

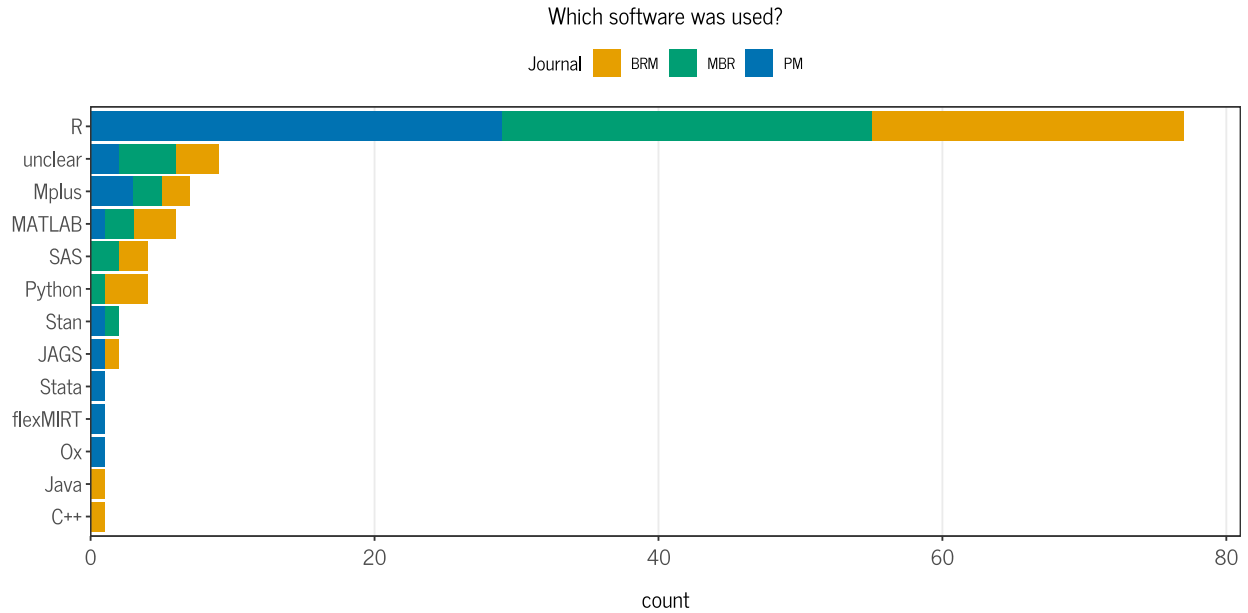


```
## Q18 Which software was used to conduct the simulation?
q18a <- ggplot(data = sim_res_fac, aes(x = software_1_q18, fill = journal)) +
  geom_bar() +
  labs(x = NULL, title = "Which primary software was used?", fill = "Journal") +
  scale_fill_manual(values = cols) +
  theme(panel.grid.major.y =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

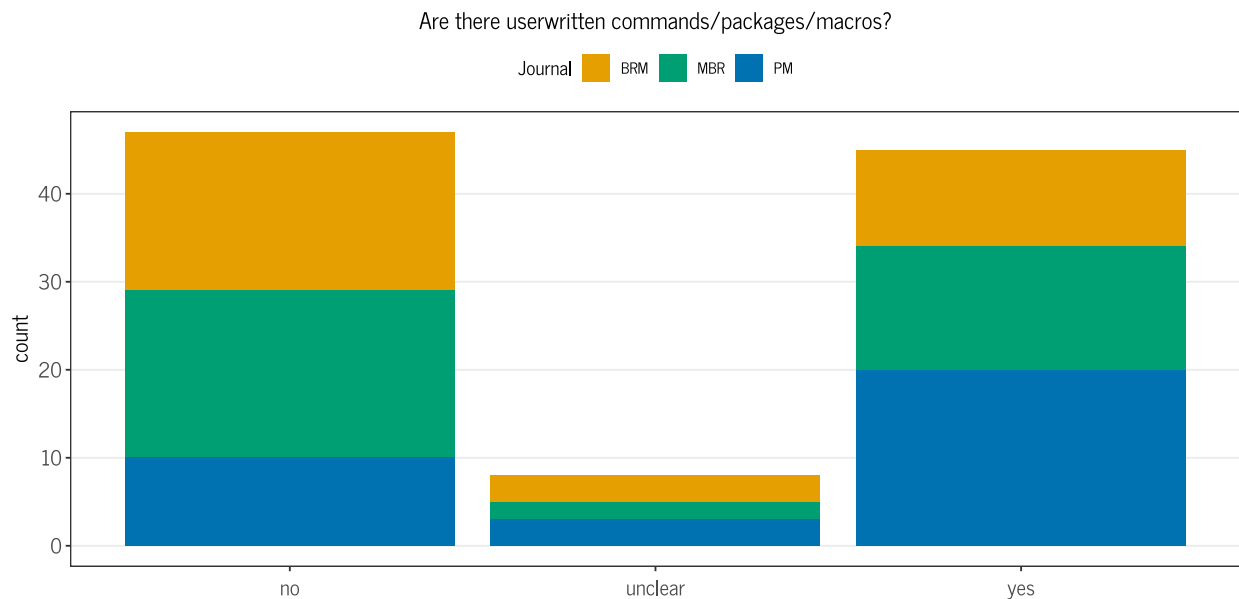
q18a



```
# 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_manual(values = cols) +
  scale_y_continuous(limits = c(0, 81), expand = c(0,0))+
  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_manual(values = cols) +
  theme(panel.grid.major.x = element_blank())
q19
```



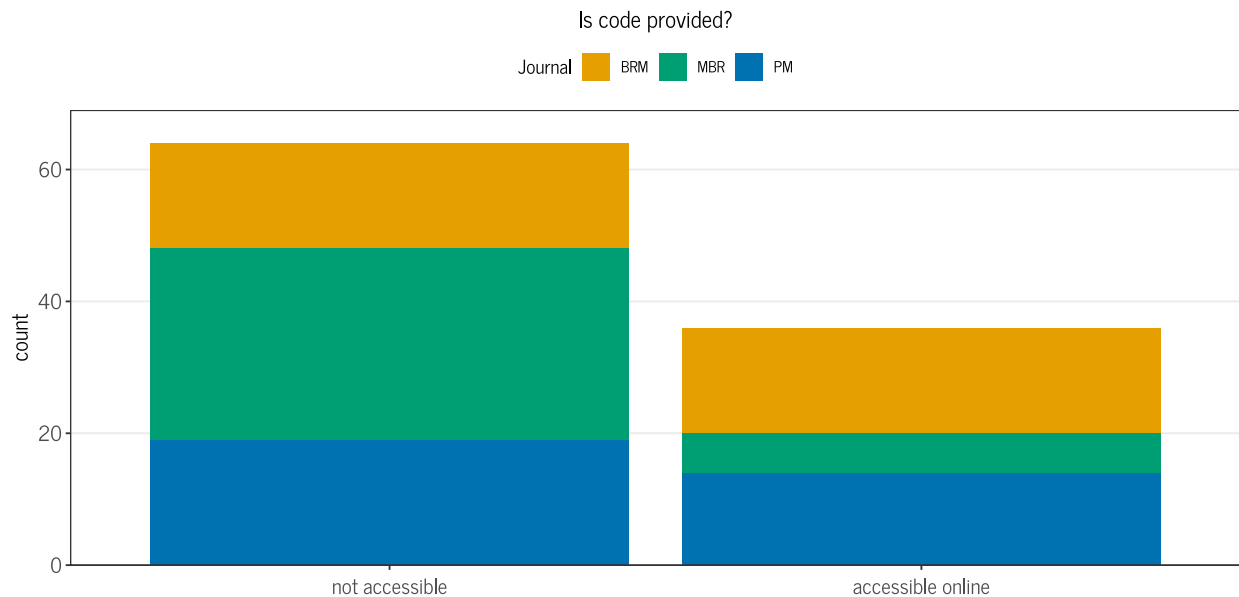
```
## Q20 Is code provided?
q20_plot_max <- max(table(sim_res_fac$codeprovided_q20)) + 5
```

```

# Reordered this such that negative is on the left to stay consistent
q20 <- sim_res_fac %>%
  mutate(codeprovided_q20 = as.factor(codeprovided_q20)) %>%
  mutate(codeprovided_q20 = reorder(codeprovided_q20, codeprovided_q20,
                                   length, decreasing = TRUE)) %>%

  ggplot(aes(x = codeprovided_q20, fill = journal)) +
  geom_bar() +
  labs(x = NULL, title = "Is code provided?", fill = "Journal") +
  scale_fill_manual(values = cols) +
  scale_y_continuous(limits = c(0, q20_plot_max), expand = c(0,0))+
  theme(panel.grid.major.x = element_blank())
q20

```



```

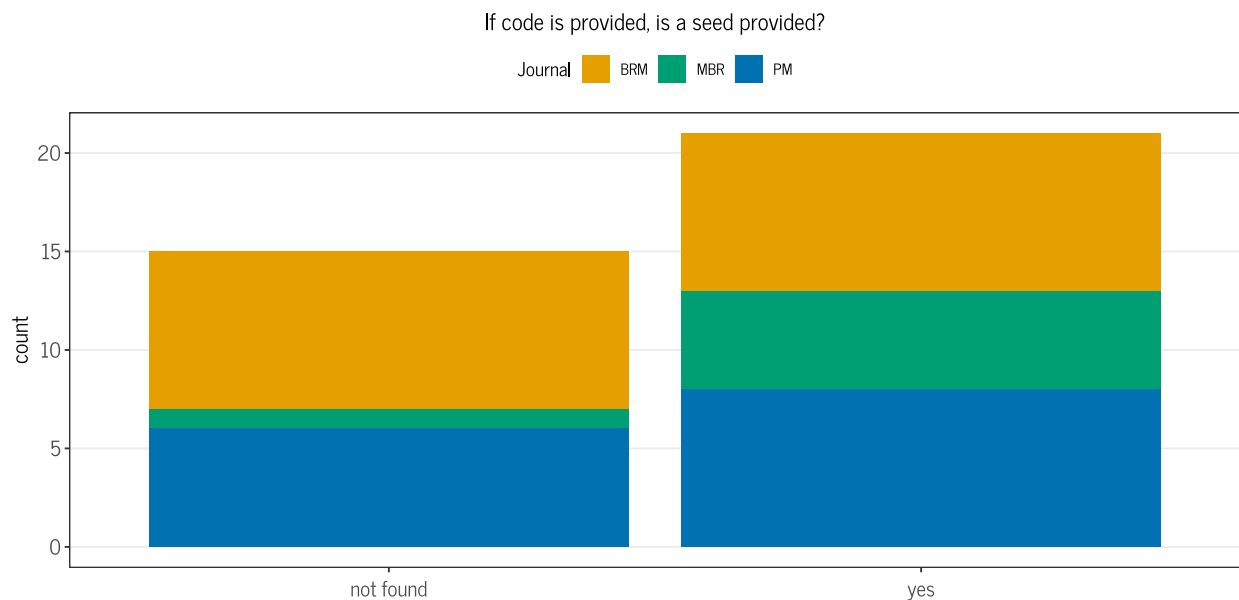
## Q21 If code is provided, is a seed provided?
q21 <- ggplot(data = sim_res_fac, aes(x = seedprovided_q21, fill = journal)) +
  geom_bar() +
  labs(x = NULL, title = "If code is provided, is a seed provided?", fill = "Journal") +
  scale_fill_manual(values = cols) +
  theme(panel.grid.major.x = element_blank())

# Compute as conditional on code provided
q21 <- sim_res_fac %>%
  filter(codeprovided_q20 == "accessible online") %>%
  ggplot(aes(x = seedprovided_q21, fill = journal))+
  geom_bar()+
  labs(x = NULL, title = "If code is provided, is a seed provided?", fill = "Journal") +
  scale_fill_manual(values = cols) +
  theme(panel.grid.major.x = element_blank())
sim_res_fac %>%
  filter(codeprovided_q20 == "accessible online") %>%
  count(seedprovided_q21)

```

```
## # A tibble: 2 x 2
##   seedprovided_q21      n
##   <fct>          <int>
## 1 not found      15
## 2 yes           21
```

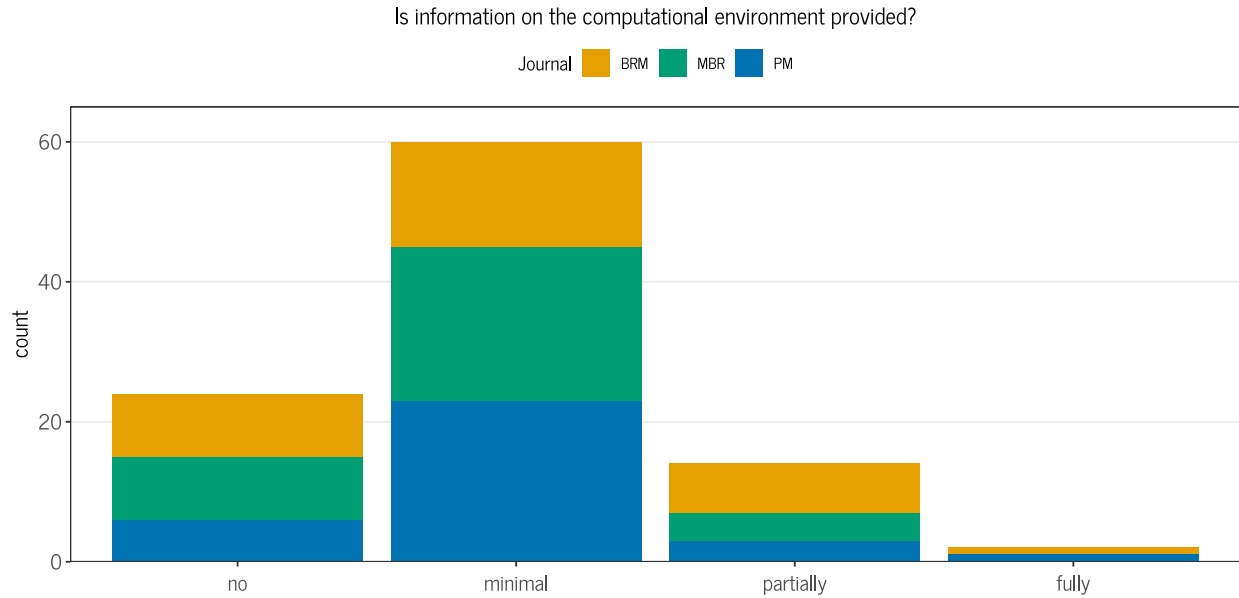
q21



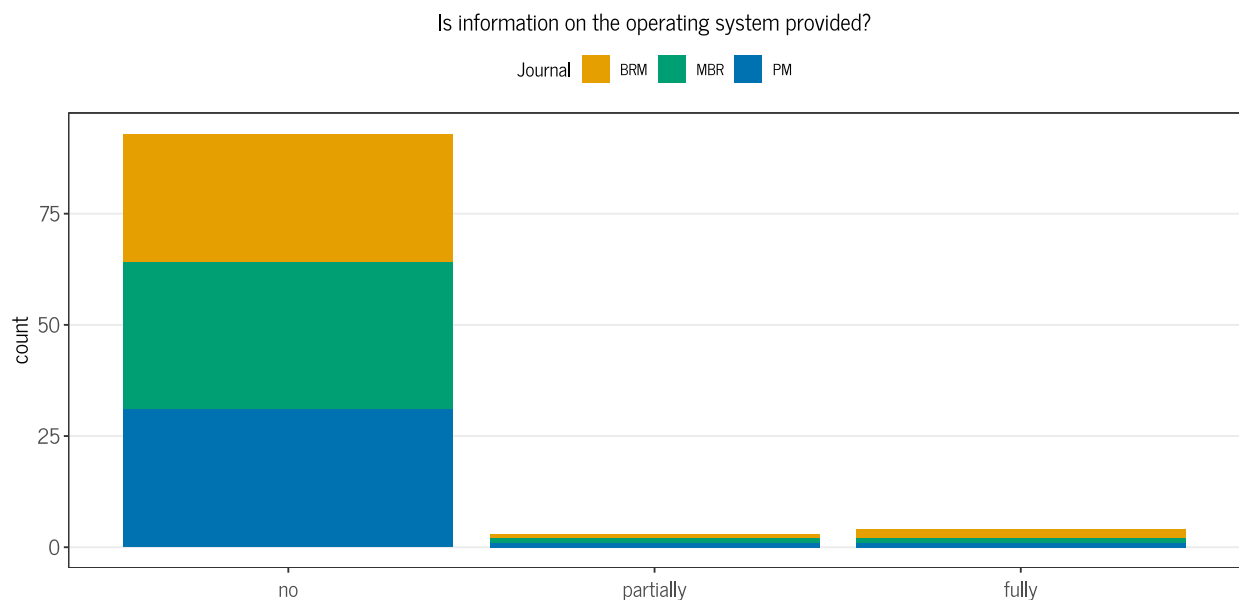
```
## Q22 Is information on the computational environment provided?
q22_plot_max <- max(table(sim_res_fac$compenvironment_q22)) + 5

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_manual(values = cols) +
  scale_y_continuous(limits = c(0, q22_plot_max), expand = c(0,0)) +
  theme(panel.grid.major.x = element_blank())
```

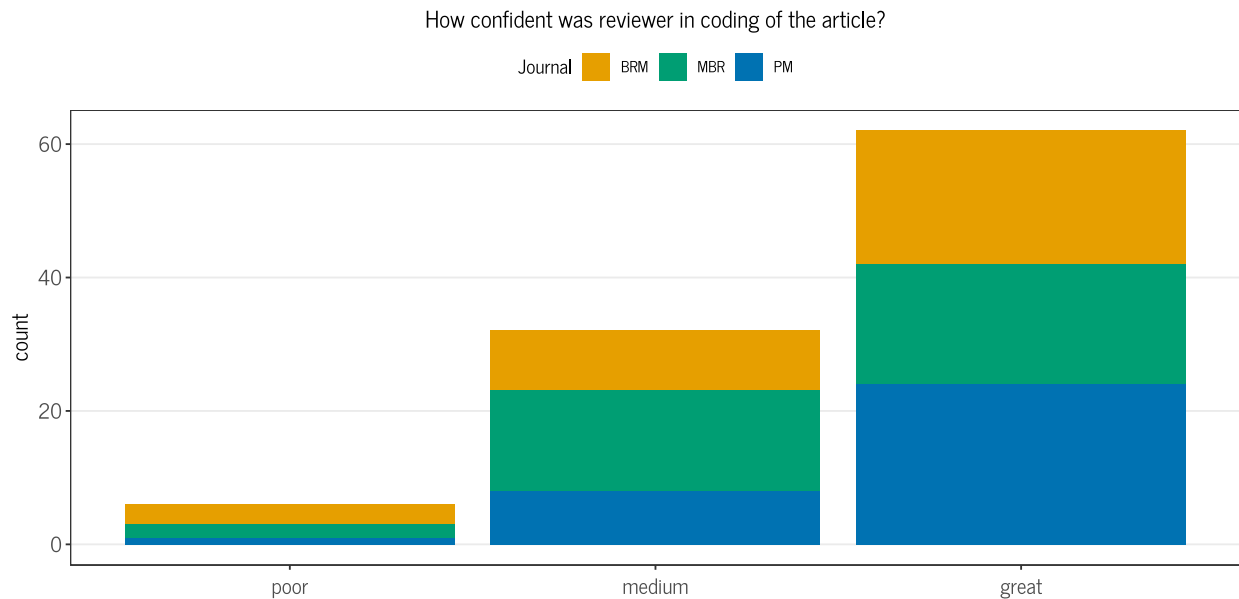
q22



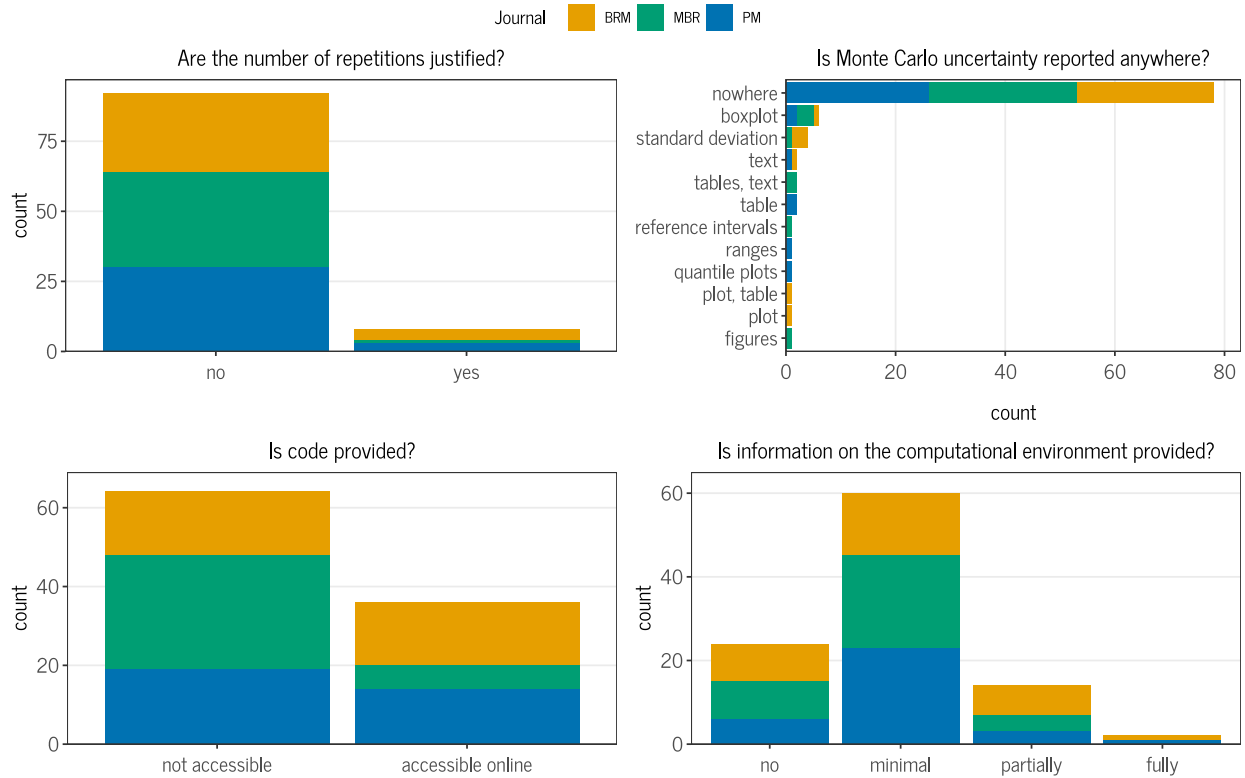
```
## Q23 Is information on the operating system provided?
q23 <- sim_res_fac %>%
  mutate(compos_q23 = factor(compos_q23,
                             levels = c("no", "partially", "fully"))) %>%
  ggplot(aes(x = compos_q23, fill = journal)) +
  geom_bar() +
  labs(x = NULL, title = "Is information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



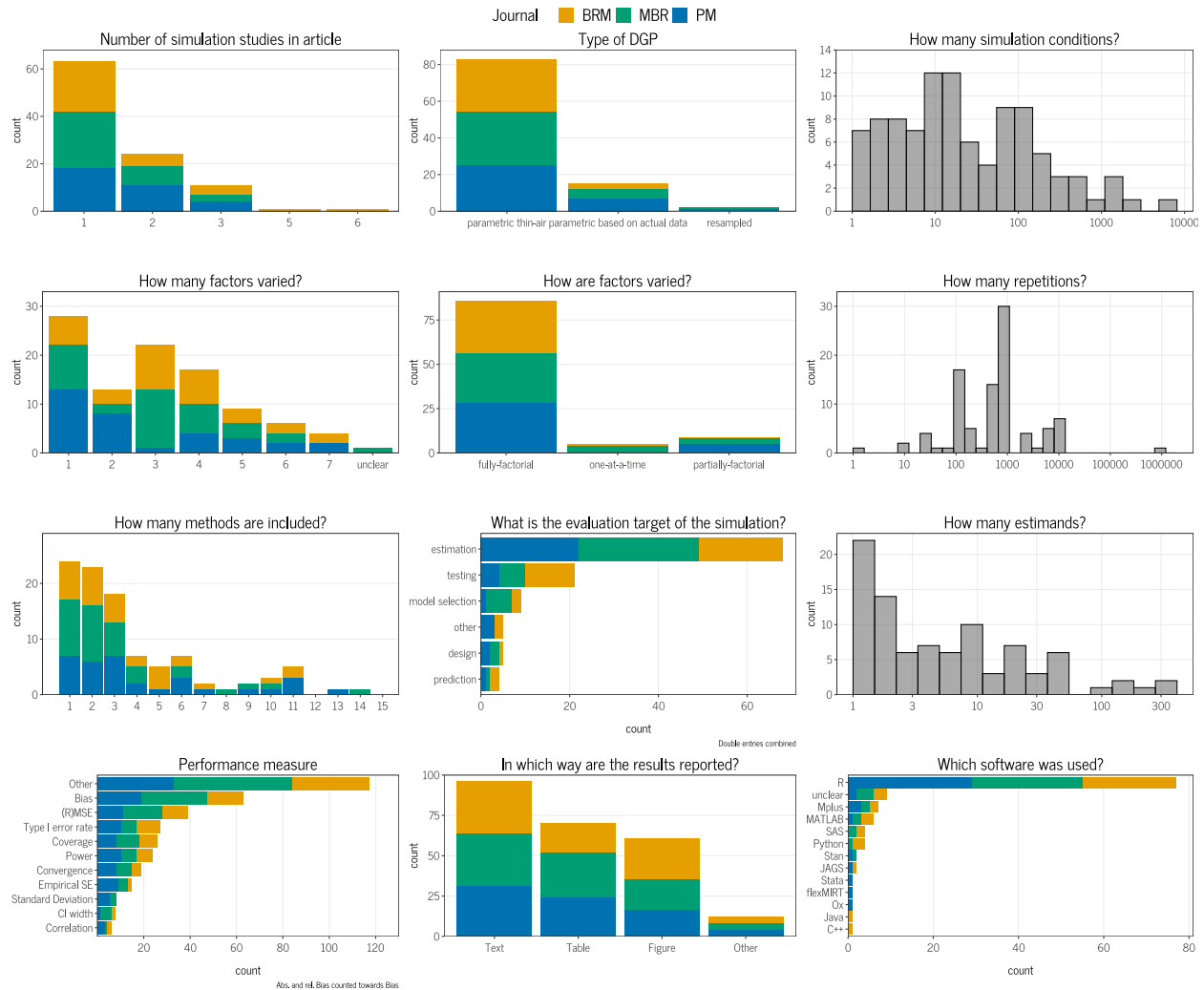
```
## Q24 How confident was reviewer in coding of the article?
q24 <- sim_res_fac %>%
  mutate(coding_confidence = factor(coding_confidence,
                                    levels = c("poor", "medium", "great"))) %>%
  ggplot(aes(x = coding_confidence, fill = journal)) +
  geom_bar() +
  labs(x = NULL, title = "How confident was reviewer in coding of the article?",
       fill = "Journal") +
  scale_fill_manual(values = cols) +
  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,
                  align = "h")
```



```
## composite plot 2 - descriptives
plotList <- lapply(X = list(q2, q4, q6, q7a, q7b, q8, q14,
                           q15a_new, q11, q15b, q17, q18b),
  ## this plot requires a different title size
  FUN = function(plot) {
    plot +
      theme(plot.title = element_text(size = rel(1.6)),
            legend.title = element_text(size = rel(1.6)),
            legend.text = element_text(size = rel(1.6)),
            legend.spacing = unit(1.5, "cm"))
  })
ggpubr::ggarrange(plotlist = plotList,
  ncol = 3, nrow = 4, common.legend = TRUE, align = "h")
```



Descriptives

The following still needs some cleaning.

```
# detailed per-journal descriptives
journal_describe <- sim_res_fac %>%
  split(.$journal) %>%
  purrr::map(~Hmisc::describe(.x))

# In a tidy way for long summary table
summary_vars <- c(
  "reviewer", "simstudy_q1",
  "nsimstudies_q2", "whichsim", "aimsdefined_q3",
  "dgptype_q4",
  # "dgpparameters_q5",
  # "nconds_q6",
  "factorsvaried_q7", "dgmfactorial_q7",
  # "nsim_q8",
```

```

"nsimjustified_q9",
"estimandstated_q10",
# "nestimands_q11",
"estimandsagg_q12", "truetheta_q13",
"nmethods_q14",
"target_q15",
"pmconvergence_q15", "pmbias_q15", "pmempse_q15", "pm_r_mse_q15",
"pmcover_q15", "pmtypeierror_q15", "pmpower_q15", "pmciwidth_q15",
"pmsclear_q15", "mcerrors_q16",
"resultsfigure_q17", "resultstable_q17", "resultstext_q17",
"resultsother_q17", "software_1_q18", "software_2_q18",
"software_3_q18", "software", "userwritten_q19",
"codeprovided_q20", "seedprovided_q21",
"compenvironment_q22", "compos_q23",
"coding_confidence"
)

sim_res_fac %>%
  as.data.frame() %>%
  group_by(journal) %>%
  pivot_longer(cols = starts_with("software"),
               names_to = NULL,
               values_to = "software",
               values_drop_na = TRUE) %>%
  mutate(software = as.factor(software)) %>%
  pivot_longer(cols = any_of(summary_vars),
               names_to = "col", values_to = "response") %>%
  select(journal, col, response) %>%
  group_by(journal, col) %>%
  count(response) %>%
  # filter(!is.na(response)) %>%
  # View()
  pivot_wider(id_cols = c(col, response),
              names_from = journal,
              values_from = n,
              values_fill = 0) %>%
  arrange(factor(col, levels = summary_vars)) %>%
  rowwise() %>%
  mutate(Sum = sum(BRM, MBR, PM)) %>%
  knitr::kable("latex", longtable = TRUE, caption = "Grouped by Journal") %>%
  kableExtra::column_spec(1, bold = TRUE) %>%
  kableExtra::collapse_rows(columns = 1:2, valign = "top")

```

Table 1: Grouped by Journal

| col | response | BRM | MBR | PM | Sum |
|--------------------|----------|-----|-----|----|-----|
| reviewer | BS | 11 | 15 | 13 | 39 |
| | FB | 5 | 16 | 16 | 37 |
| | SP | 22 | 7 | 11 | 40 |
| simstudy_q1 | yes | 38 | 38 | 40 | 116 |
| | 1 | 24 | 26 | 21 | 71 |
| | 2 | 6 | 8 | 14 | 28 |

nsimstudies_q2

| | | | | | |
|--------------------|---------------------------------|----|----|----|-----|
| | 3 | 6 | 4 | 5 | 15 |
| | 5 | 1 | 0 | 0 | 1 |
| | 6 | 1 | 0 | 0 | 1 |
| whichsim | 1 | 31 | 26 | 31 | 88 |
| | NA | 7 | 11 | 8 | 26 |
| | 2 | 0 | 1 | 0 | 1 |
| | 3 | 0 | 0 | 1 | 1 |
| aimsdefined_q3 | no | 1 | 1 | 1 | 3 |
| | unclear | 2 | 1 | 0 | 3 |
| | yes | 35 | 36 | 39 | 110 |
| dgptype_q4 | parametric based on actual data | 3 | 6 | 8 | 17 |
| | parametric thin-air | 35 | 31 | 31 | 97 |
| | resampled | 0 | 1 | 1 | 2 |
| factorsvaried_q7 | 1 | 8 | 9 | 16 | 33 |
| | 2 | 3 | 2 | 9 | 14 |
| | 3 | 11 | 14 | 1 | 26 |
| | 5 | 3 | 4 | 4 | 11 |
| | 6 | 3 | 2 | 2 | 7 |
| | 4 | 8 | 6 | 6 | 20 |
| | 7 | 2 | 0 | 2 | 4 |
| | unclear | 0 | 1 | 0 | 1 |
| dgmfactorial_q7 | fully-factorial | 35 | 30 | 35 | 100 |
| | one-at-a-time | 1 | 4 | 0 | 5 |
| | partially-factorial | 2 | 4 | 5 | 11 |
| nsimjustified_q9 | no | 32 | 36 | 37 | 105 |
| | yes | 6 | 2 | 3 | 11 |
| estimandstated_q10 | no | 6 | 3 | 2 | 11 |
| | unclear | 4 | 5 | 0 | 9 |
| | yes | 28 | 30 | 36 | 94 |
| | not applicable | 0 | 0 | 2 | 2 |
| estimandsagg_q12 | no | 31 | 29 | 33 | 93 |
| | unclear | 1 | 4 | 0 | 5 |
| | yes | 6 | 5 | 7 | 18 |
| truetheta_q13 | estimated | 2 | 3 | 2 | 7 |
| | known | 36 | 35 | 36 | 107 |
| | not applicable | 0 | 0 | 2 | 2 |
| nmethods_q14 | 1 | 8 | 11 | 7 | 26 |
| | 2 | 9 | 11 | 7 | 27 |
| | 3 | 6 | 7 | 7 | 20 |
| | 5 | 6 | 0 | 2 | 8 |
| | 6 | 2 | 2 | 6 | 10 |
| | 4 | 2 | 3 | 3 | 8 |
| | 7 | 1 | 0 | 1 | 2 |
| | 10 | 1 | 0 | 1 | 2 |
| | 11 | 2 | 0 | 3 | 5 |
| | 192 | 1 | 0 | 0 | 1 |
| | 10? | 0 | 1 | 0 | 1 |
| | 14 | 0 | 1 | 0 | 1 |
| | 8 | 0 | 1 | 0 | 1 |
| | 9 | 0 | 1 | 1 | 2 |
| | 11+ | 0 | 0 | 1 | 1 |
| | 13 | 0 | 0 | 1 | 1 |
| | design | 1 | 1 | 2 | 4 |
| | estimation | 16 | 22 | 28 | 66 |

target_q15

| | | | | | |
|-------------------|-----------------------------|----|----|----|-----|
| | estimation, testing | 7 | 4 | 0 | 11 |
| | model selection | 2 | 4 | 1 | 7 |
| | other | 3 | 0 | 4 | 7 |
| | prediction | 3 | 1 | 1 | 5 |
| | testing | 6 | 2 | 4 | 12 |
| | design, estimation | 0 | 1 | 0 | 1 |
| | estimation, model selection | 0 | 3 | 0 | 3 |
| pmconvergence_q15 | no | 33 | 30 | 25 | 88 |
| | yes | 5 | 8 | 12 | 25 |
| | unclear | 0 | 0 | 3 | 3 |
| pmbias_q15 | no | 22 | 13 | 26 | 61 |
| | yes | 16 | 25 | 14 | 55 |
| pmempse_q15 | no | 36 | 33 | 29 | 98 |
| | yes | 2 | 5 | 11 | 18 |
| pm_r_mse_q15 | no | 24 | 20 | 24 | 68 |
| | yes | 14 | 18 | 16 | 48 |
| pmcover_q15 | no | 27 | 27 | 31 | 85 |
| | yes | 11 | 11 | 9 | 31 |
| pmtypeierror_q15 | no | 26 | 31 | 28 | 85 |
| | yes | 12 | 7 | 12 | 31 |
| pmpower_q15 | no | 29 | 31 | 28 | 88 |
| | yes | 9 | 7 | 12 | 28 |
| pmciwidth_q15 | no | 36 | 33 | 38 | 107 |
| | yes | 2 | 5 | 2 | 9 |
| pmsclear_q15 | no | 2 | 1 | 3 | 6 |
| | unclear | 3 | 0 | 2 | 5 |
| | yes | 33 | 37 | 32 | 102 |
| | NA | 0 | 0 | 3 | 3 |
| mcerrors_q16 | boxplot | 1 | 4 | 2 | 7 |
| | nowhere | 29 | 29 | 33 | 91 |
| | plot | 1 | 0 | 0 | 1 |
| | plot, table | 1 | 0 | 0 | 1 |
| | standard deviation | 5 | 1 | 0 | 6 |
| | text | 1 | 0 | 1 | 2 |
| | figures | 0 | 1 | 0 | 1 |
| | reference intervals | 0 | 1 | 0 | 1 |
| | tables, text | 0 | 2 | 0 | 2 |
| | quantile plots | 0 | 0 | 1 | 1 |
| | ranges | 0 | 0 | 1 | 1 |
| | table | 0 | 0 | 2 | 2 |
| resultsfigure_q17 | no | 7 | 17 | 23 | 47 |
| | yes | 31 | 21 | 17 | 69 |
| resultstable_q17 | no | 16 | 8 | 9 | 33 |
| | yes | 22 | 30 | 31 | 83 |
| resultstext_q17 | | 38 | 36 | 38 | 112 |
| | no | 0 | 2 | 2 | 4 |
| resultsother_q17 | | 32 | 34 | 36 | 102 |
| | yes | 6 | 4 | 4 | 14 |
| | unclear | 3 | 4 | 2 | 9 |
| | C++ | 1 | 0 | 0 | 1 |
| | JAGS | 1 | 0 | 1 | 2 |
| | Java | 1 | 0 | 0 | 1 |
| | MATLAB | 3 | 2 | 1 | 6 |
| | Mplus | 2 | 2 | 3 | 7 |

| | | | | | |
|---------------------|-------------------|----|----|----|-----|
| | Python | 3 | 1 | 0 | 4 |
| | R | 22 | 26 | 29 | 77 |
| | SAS | 2 | 2 | 0 | 4 |
| | Stan | 0 | 1 | 1 | 2 |
| | Ox | 0 | 0 | 1 | 1 |
| | flexMIRT | 0 | 0 | 1 | 1 |
| | Stata | 0 | 0 | 1 | 1 |
| userwritten_q19 | no | 20 | 21 | 12 | 53 |
| | unclear | 4 | 2 | 4 | 10 |
| | yes | 14 | 15 | 24 | 53 |
| codeprovided_q20 | accessible online | 19 | 6 | 18 | 43 |
| | not accessible | 19 | 32 | 22 | 73 |
| seedprovided_q21 | yes | 9 | 5 | 11 | 25 |
| | not found | 29 | 33 | 29 | 91 |
| compenvironment_q22 | no | 11 | 10 | 7 | 28 |
| | fully | 1 | 0 | 1 | 2 |
| | minimal | 16 | 24 | 27 | 67 |
| | partially | 10 | 4 | 5 | 19 |
| compos_q23 | no | 35 | 36 | 37 | 108 |
| | fully | 2 | 1 | 1 | 4 |
| | partially | 1 | 1 | 2 | 4 |
| coding_confidence | great | 24 | 18 | 28 | 70 |
| | medium | 10 | 18 | 11 | 39 |
| | poor | 4 | 2 | 1 | 7 |

```
# Ungrouped and with proportions
sim_res_fac %>%
  as.data.frame() %>%
  # pivot_longer(cols = starts_with("software"),
  #             names_to = NULL,
  #             values_to = "software",
  #             values_drop_na = TRUE) %>%
  # mutate(software = as.factor(software)) %>%
  pivot_longer(cols = any_of(summary_vars),
              names_to = "col", values_to = "response") %>%
  select(col, response) %>%
  group_by(col) %>%
  count(response) %>%
  arrange(factor(col, levels = summary_vars)) %>%
  knitr::kable("latex", longtable = TRUE, caption = "Ungrouped") %>%
  kableExtra::column_spec(1, bold = TRUE) %>%
  kableExtra::collapse_rows(columns = 1:2, valign = "top")
```

Table 2: Ungrouped

| col | response | n |
|-------------|----------|-----|
| reviewer | BS | 32 |
| | FB | 34 |
| | SP | 34 |
| simstudy_q1 | yes | 100 |
| | 1 | 63 |
| | 2 | 24 |
| | 3 | 11 |

nsimstudies_q2

| | | |
|--------------------|---------------------------------|----|
| | 5 | 1 |
| | 6 | 1 |
| whichsim | 1 | 73 |
| | 2 | 1 |
| | 3 | 1 |
| | NA | 25 |
| aimsdefined_q3 | no | 3 |
| | unclear | 3 |
| | yes | 94 |
| dgptype_q4 | parametric based on actual data | 15 |
| | parametric thin-air | 83 |
| | resampled | 2 |
| factorsvaried_q7 | unclear | 1 |
| | 1 | 28 |
| | 2 | 13 |
| | 3 | 22 |
| | 5 | 9 |
| | 6 | 6 |
| | 4 | 17 |
| | 7 | 4 |
| dgmfactorial_q7 | fully-factorial | 86 |
| | one-at-a-time | 5 |
| | partially-factorial | 9 |
| nsimjustified_q9 | no | 92 |
| | yes | 8 |
| estimandstated_q10 | no | 11 |
| | unclear | 6 |
| | yes | 81 |
| | not applicable | 2 |
| estimandsagg_q12 | no | 79 |
| | unclear | 4 |
| | yes | 17 |
| truetheta_q13 | not applicable | 2 |
| | estimated | 7 |
| | known | 91 |
| nmethods_q14 | 1 | 24 |
| | 2 | 23 |
| | 3 | 18 |
| | 5 | 5 |
| | 6 | 7 |
| | 4 | 7 |
| | 7 | 2 |
| | 10 | 2 |
| | 10? | 1 |
| | 11 | 4 |
| | 11+ | 1 |
| | 13 | 1 |
| | 14 | 1 |
| | 192 | 1 |
| | 8 | 1 |
| | 9 | 2 |
| | design | 4 |
| | design, estimation | 1 |

target_q15

| | | |
|-------------------|-----------------------------|----|
| | estimation | 56 |
| | estimation, model selection | 2 |
| | estimation, testing | 9 |
| | model selection | 7 |
| | other | 5 |
| | prediction | 4 |
| | testing | 12 |
| pmconvergence_q15 | no | 79 |
| | unclear | 2 |
| | yes | 19 |
| pmbias_q15 | no | 55 |
| | yes | 45 |
| pmempse_q15 | no | 85 |
| | yes | 15 |
| pm_r_mse_q15 | no | 61 |
| | yes | 39 |
| pmcover_q15 | no | 74 |
| | yes | 26 |
| pmtypeierror_q15 | no | 73 |
| | yes | 27 |
| pmpower_q15 | no | 76 |
| | yes | 24 |
| pmciwidth_q15 | no | 92 |
| | yes | 8 |
| pmsclear_q15 | no | 5 |
| | unclear | 5 |
| | yes | 87 |
| | NA | 3 |
| mcerrors_q16 | boxplot | 6 |
| | figures | 1 |
| | nowhere | 78 |
| | plot | 1 |
| | plot, table | 1 |
| | quantile plots | 1 |
| | ranges | 1 |
| | reference intervals | 1 |
| | standard deviation | 4 |
| | table | 2 |
| | tables, text | 2 |
| | text | 2 |
| resultsfigure_q17 | no | 39 |
| | yes | 61 |
| resultstable_q17 | no | 30 |
| | yes | 70 |
| resultstext_q17 | no | 4 |
| | yes | 96 |
| resultsother_q17 | no | 88 |
| | yes | 12 |
| | unclear | 9 |
| | C++ | 1 |
| | JAGS | 1 |
| | Java | 1 |
| | MATLAB | 5 |
| | Mplus | 1 |

software_1_q18

| | | |
|---------------------|-------------------|-----|
| | Ox | 1 |
| | Python | 2 |
| | R | 76 |
| | SAS | 3 |
| software_2_q18 | JAGS | 1 |
| | MATLAB | 1 |
| | Mplus | 6 |
| | Python | 2 |
| | R | 1 |
| | SAS | 1 |
| | flexMIRT | 1 |
| | Stan | 2 |
| | Stata | 1 |
| | NA | 84 |
| software_3_q18 | | 100 |
| userwritten_q19 | no | 47 |
| | unclear | 8 |
| | yes | 45 |
| codeprovided_q20 | accessible online | 36 |
| | not accessible | 64 |
| seedprovided_q21 | yes | 21 |
| | not found | 79 |
| compenvironment_q22 | no | 24 |
| | fully | 2 |
| | minimal | 60 |
| | partially | 14 |
| compos_q23 | no | 93 |
| | fully | 4 |
| | partially | 3 |
| coding_confidence | great | 62 |
| | medium | 32 |
| | poor | 6 |

Analyses of individual questions:

```
# Q8:
sim_res_num$nsim_q8 %>%
  table()
```

```
## .
##      1      10      25      30      50      60      100      200      400      500      800      1000      2000
##      1       2       1       3       1       1       17       5       1       14       1       29       3
## 2500 3000 5000 10000 1e+06
##      1       1       5       7       1
```

```
# Q15a:
sim_res_fac %>%
  separate_wider_delim(target_q15,
                        delim = ",",
                        names_sep = "_",
                        too_few = "align_start") %>%
  pivot_longer(cols = contains("target"),
               names_to = NULL,
```

```

      values_to = "target",
      values_drop_na = TRUE) %>%
mutate(target = str_trim(target)) %>%
mutate(target = as.factor(target)) %>%
count(target) %>%
arrange(desc(n))

```

```

## # A tibble: 6 x 2
##   target      n
##   <fct>    <int>
## 1 estimation    68
## 2 testing      21
## 3 model selection    9
## 4 design         5
## 5 other          5
## 6 prediction       4

```

```

# Q15:
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(pmcwidth_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) %>% group_by(PM) %>% summarize(sum = sum(count)) %>% arrange(desc(sum))

```

```

## # A tibble: 11 x 2
##   PM      sum
##   <chr>    <int>
## 1 Other    117
## 2 Bias     63
## 3 (R)MSE   39
## 4 Type I error rate 27
## 5 Coverage 26
## 6 Power    24
## 7 Convergence 19
## 8 Empirical SE 15
## 9 CI width   8
## 10 Standard Deviation 8
## 11 Correlation 6

```

```
sessionInfo()
```

```
## R version 4.3.1 (2023-06-16 ucrt)
```

```

## Platform: x86_64-w64-mingw32/x64 (64-bit)
## Running under: Windows 11 x64 (build 22621)
##
## Matrix products: default
##
## locale:
## [1] LC_COLLATE=German_Germany.utf8  LC_CTYPE=German_Germany.utf8
## [3] LC_MONETARY=German_Germany.utf8 LC_NUMERIC=C
## [5] LC_TIME=German_Germany.utf8
##
## time zone: Europe/Berlin
## tzcode source: internal
##
## attached base packages:
## [1] stats      graphics  grDevices  utils      datasets  methods    base
##
## other attached packages:
## [1] showtext_0.9-6      showtextdb_3.0      sysfonts_0.8.8
## [4] kableExtra_1.3.4.9000 knitr_1.43          forcats_1.0.0
## [7] stringr_1.5.0       ggpubr_0.6.0        colorspace_2.1-0
## [10] ggplot2_3.4.3       tidyr_1.3.0         dplyr_1.1.2
##
## loaded via a namespace (and not attached):
## [1] gtable_0.3.4      xfun_0.40          htmlwidgets_1.6.2 rstatix_0.7.2
## [5] vctr_0.6.3        tools_4.3.1        generics_0.1.3    curl_5.0.2
## [9] tibble_3.2.1      fansi_1.0.4        highr_0.10        cluster_2.1.4
## [13] pkgconfig_2.0.3   data.table_1.14.8  checkmate_2.2.0   webshot_0.5.5
## [17] lifecycle_1.0.3   compiler_4.3.1     farver_2.1.1      munsell_0.5.0
## [21] carData_3.0-5     htmltools_0.5.6    yaml_2.3.7        htmlTable_2.4.1
## [25] Formula_1.2-5     pillar_1.9.0       car_3.1-2         Hmisc_5.1-0
## [29] rpart_4.1.19      abind_1.4-5        tidyselect_1.2.0  rvest_1.0.3
## [33] digest_0.6.33     stringi_1.7.12     purrr_1.0.2       labeling_0.4.2
## [37] cowplot_1.1.1     fastmap_1.1.1      grid_4.3.1        cli_3.6.1
## [41] magrittr_2.0.3    base64enc_0.1-3    utf8_1.2.3        broom_1.0.5
## [45] foreign_0.8-84    withr_2.5.0        scales_1.2.1      backports_1.4.1
## [49] rmarkdown_2.24    httr_1.4.7         nnet_7.3-19       gridExtra_2.3
## [53] ggsignif_0.6.4    evaluate_0.21      viridisLite_0.4.2 rlang_1.1.1
## [57] glue_1.6.2        xml2_1.3.5         svglite_2.1.1     rstudioapi_0.15.0
## [61] jsonlite_1.8.7    R6_2.5.1           systemfonts_1.0.4

```