

# Figure 9

## Overview

This script takes data frames produced by solutions\_plots.qmd, solutions\_stats.qmd, and future\_contributors\_plots.qmd and outputs a figure that adheres to PLOS submission guidelines.

## Import packages and utilities

```
project_root <- here::here() # requires that you be somewhere in the
# project directory (not above it)
# packages
suppressMessages(source(file.path(project_root, "scripts/packages.R")))
# functions and objects used across scripts
suppressMessages(source(file.path(project_root, "scripts/utils.R")))
```

## Load data

```
# This poorly named function from utils.R
# is basically just read.csv with my data path in there
exp <- load_qualtrics_data(file.path("data_for_plots/exp_fave_solns.tsv"))
emm <- load_qualtrics_data(file.path("data_for_plots/emms_solns.tsv"))
asp <- load_qualtrics_data(file.path("data_for_plots/asp_fave_solns.tsv"))
# Note these solutions are deliberately in reverse order;
# these will be flipped later w coord_flip()
solns_ordered <- load_qualtrics_data(file.path("data_for_plots/solns_ordered.tsv"))$soln
```

```
emm$job_category <- gsub("Non-research Staff", "Non-research staff", emm$job_category)
emm$job_category <- gsub("Postdocs and Staff Researchers", "Postdocs and staff researchers",
```

## Plot

```
# from scripts/utils.R
exp <- reorder_factor_by_column(
  df = exp,
  factor_col = Var1,
  value_col = Freq,
  descending = FALSE
)

p_exp <- basic_bar_chart(
  df = exp,
  x_var = "Var1",
  y_var = "Freq",
  title = "Experienced contributors'\nfavorite solutions",
  show_axis_title_x = TRUE,
  show_axis_title_y = FALSE,
  show_ticks_y = FALSE,
  ylabel = "Number of respondents",
  show_bar_labels = TRUE,
  color_index = 11,
  horizontal = TRUE,
  axis_title_size_x = 6,
  axis_title_size_y = 6,
  axis_text_size_x = 6,
  axis_text_size_y = 6,
  title_size = 7,
  label_size = 2,
  x_axis_title_margin_t = 5,
  plot_title_margin_b = 5,
  margin_vals = c(0.3, 0.3, 0, 0.3)
)

emm <- emm %>%
  mutate(solution = factor(solution, levels = solns_ordered))
```

```

interleaved <- as.vector(rbind(paste0(solns_ordered, "_sp"), solns_ordered))
interleaved[length(interleaved)+1] <- "padding_sp"

# Define a position dodge object to ensure points and error bars align
pd <- position_dodge(width = 0.5)

# one stripe per real category row
bg <- tibble(cat = factor(interleaved, levels = interleaved)) %>%
  mutate(
    ymin = as.numeric(cat) - 0.5,
    ymax = as.numeric(cat) + 0.5
  )
bg_even <- dplyr::filter(bg, row_number() %% 2 == 0)
bg_odd <- dplyr::filter(bg, row_number() %% 2 == 1)

# Create the single, combined plot
p_emm <- ggplot(emm,
  aes(x = solution, y = mean,
      color = job_category,
      shape = job_category,
      group = job_category)) +
# It's important that these rectangles are above the points and
# errors bars, so they'll be the bottom layer on the plot
  geom_rect(data = bg_odd,
            aes(xmin = ymin, xmax = ymax, ymin = -Inf, ymax = Inf),
            inherit.aes = FALSE, fill = "#f8f8f8", color = NA) +
  geom_rect(data = bg_even,
            aes(xmin = ymin, xmax = ymax, ymin = -Inf, ymax = Inf),
            inherit.aes = FALSE, fill = "#e6e6e6", color = NA) +
  geom_hline(yintercept = seq(1, 3, 0.5), color = "gray90") +
  geom_errorbar(aes(ymin = lwr, ymax = upr),
                width = 0.2,
                linewidth = 0.2,
                position = pd) +
  geom_point(size = 1.5, position = pd) +
  scale_shape_manual(values = c(16, 17, 15, 18)) +
  scale_color_manual(values = c(COLORS[2], COLORS[1], COLORS[3], COLORS[4]))+
  scale_x_discrete(limits = interleaved, breaks = solns_ordered) +
  ylim(c(1, 3)) +
  labs(
    title = "Estimated mean rating by job category",

```

```

    x = NULL,
    y = "Estimated mean rating"
) +
coord_flip() +
theme(
  plot.title = element_text(
    size = 7,
    hjust = 0,
    face = "bold"
  ),
  axis.text.x = element_text(size = 6),
  axis.text.y = element_text(size = 6),
  axis.title.x = element_text(size = 7),
  panel.background = element_blank(),
  #panel.grid.major.x = element_line(linetype = "solid", color = "gray90"),
  #panel.grid.major.y = element_line(linetype = "dashed", color = "gray95"),
  plot.margin = unit(c(0, 0.3, 0.3, 0.3), "cm"),
  legend.title = element_blank(),
  legend.text=element_text(size=6)
)

```

```

asp <- asp %>%
  mutate(Solution = fct_reorder(Solution, Count, .desc = FALSE))

p_asp <- basic_bar_chart(asp,
  x_var = "Solution",
  y_var = "Count",
  title = "What would help aspiring\ncontributors get started",
  horizontal = TRUE,
  show_bar_labels = TRUE,
  show_ticks_y = FALSE,
  color_index = 12,
  show_axis_title_x = TRUE,
  show_axis_title_y = FALSE,
  show_grid = TRUE,
  axis_title_size_x = 6,
  axis_title_size_y = 6,
  axis_text_size_x = 6,
  axis_text_size_y = 6,
  title_size = 7,
  label_size = 2,
  x_axis_title_margin_t = 5,

```

```
  plot_title_margin_b = 5
)

# From the patchwork package
layout <- "
AABB
CCBB
"
p_combined <- p_exp + p_emm + p_asp +
  plot_layout(design = layout)

ggsave(
  filename = file.path(FIGURE_PATH, "Fig9.tif"),
  plot = p_combined + plot_annotation(tag_levels = "A") & theme(plot.tag = element_text(size =
device = "tiff",
width = 7.5, height = 4, units = "in",
dpi = 300,
compression = "none",
bg = "white"
)
```