Supplement 5

Plots for modified Farnsworth-Munsell hue test

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Contents

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1   Research question

1. Ordering of colour chart.

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2   Load data

```
data <- read_rds('data-cleaned/clean-data-hue.rds')
```

---

3   Quick look at the data

```
dim(data)
```

```
## [1] 180   7
```

```
names(data)
```

```
## [1] "ID"          "test_given"  "colour"      "SaO2"        "colour_SaO2"
## [6] "delta"       "error"
```

```
glimpse(data)
```

```
## Rows: 180
## Columns: 7
## $ ID          <dbl> 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 3...
## $ test_given  <chr> "B", "B", "B", "B", "B", "B", "B", "B", "B", "B", "B", ...
## $ colour      <chr> "colour_1", "colour_2", "colour_3", "colour_4", "colour...
## $ SaO2        <dbl> 25, 15, 35, 45, 55, 65, 75, 85, 95, 25, 15, 35, 45, 55,...
## $ colour_SaO2 <dbl> 15, 25, 35, 45, 55, 65, 75, 85, 95, 15, 25, 35, 45, 55,...
## $ delta       <dbl> 10, -10, 0, 0, 0, 0, 0, 0, 0, 10, -10, 0, 0, 0, 0, 0, 0...
## $ error       <dbl> 1, 1, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 1...
```

---

4 Process data

```r
# Convert colour from character to numeric
data <- data %>%
    mutate(colour = as.numeric(str_replace(colour,
                                           pattern = 'colour_',
                                           replacement = '')))

# Get end co-ordinate
data <- data %>%
    mutate(end = 0)
```
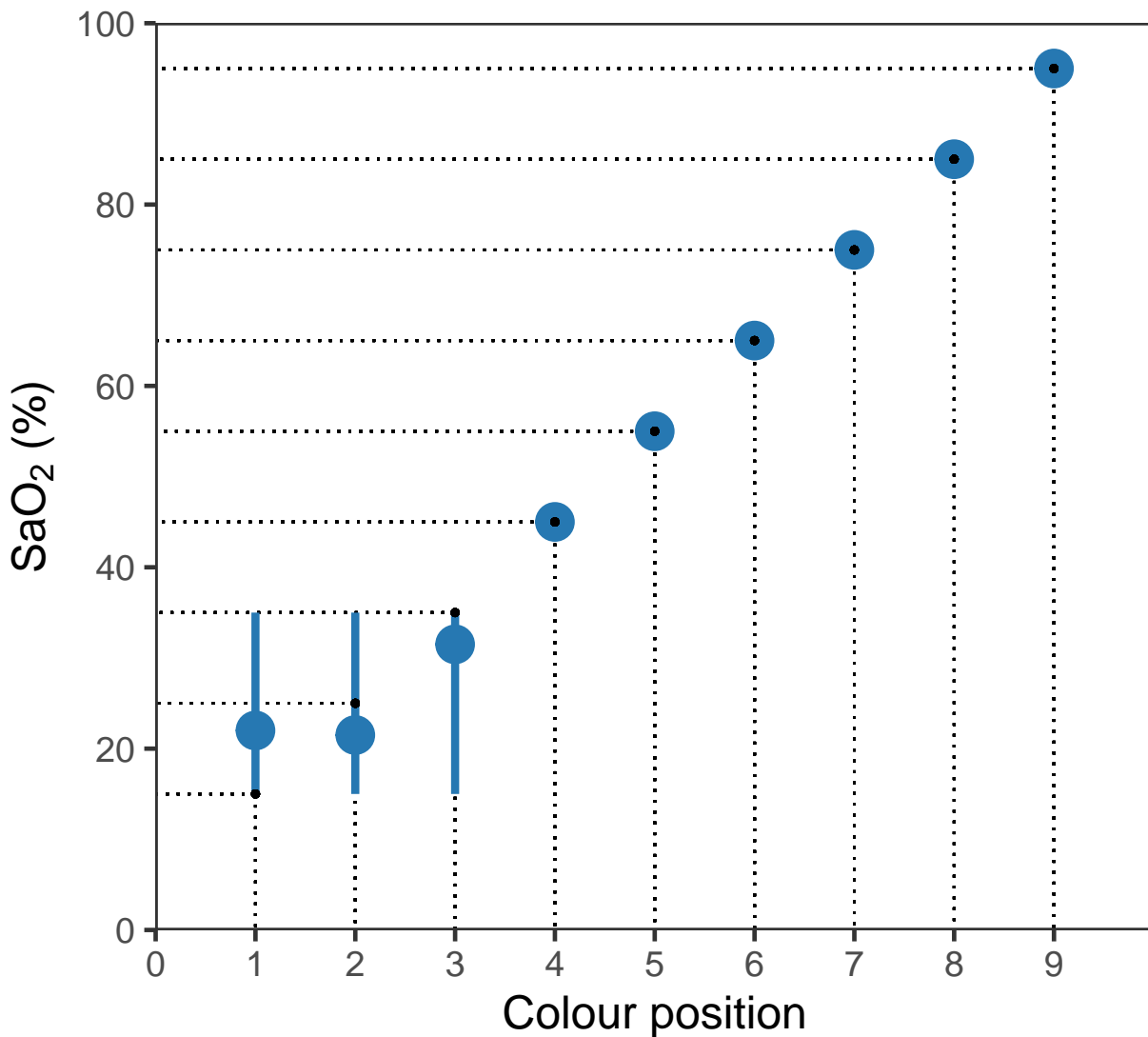
---

5 Plot 1: Positioning of colours

```r
p1 <- data %>%
    ggplot(data = .) +
    geom_segment(aes(x = colour,
                     xend = colour,
                     y = colour_SaO2,
                     yend = end),
                 linetype = 3) +
    geom_segment(aes(x = colour,
                     xend = end,
                     y = colour_SaO2,
                     yend = colour_SaO2),
                 linetype = 3) +
    stat_summary(aes(x = colour,
                     y = SaO2),
                 fun = mean,
                 fun.max = max,
                 fun.min = min,
                 size = 1.5,
                 colour = '#2678B2') +
    geom_point(aes(x = colour,
                   y = colour_SaO2),
               size = 1) +
```

```
    labs(x = 'Colour position',
         y = expression('SaO'[2]*' (%)')) +
    scale_y_continuous(expand = c(0, 0),
                       limits = c(0, 100),
                       breaks = seq(from = 0, to = 100, by = 20)) +
    scale_x_continuous(expand = c(0, 0),
                       limits = c(0, 10),
                       breaks = 0:9); p1
```
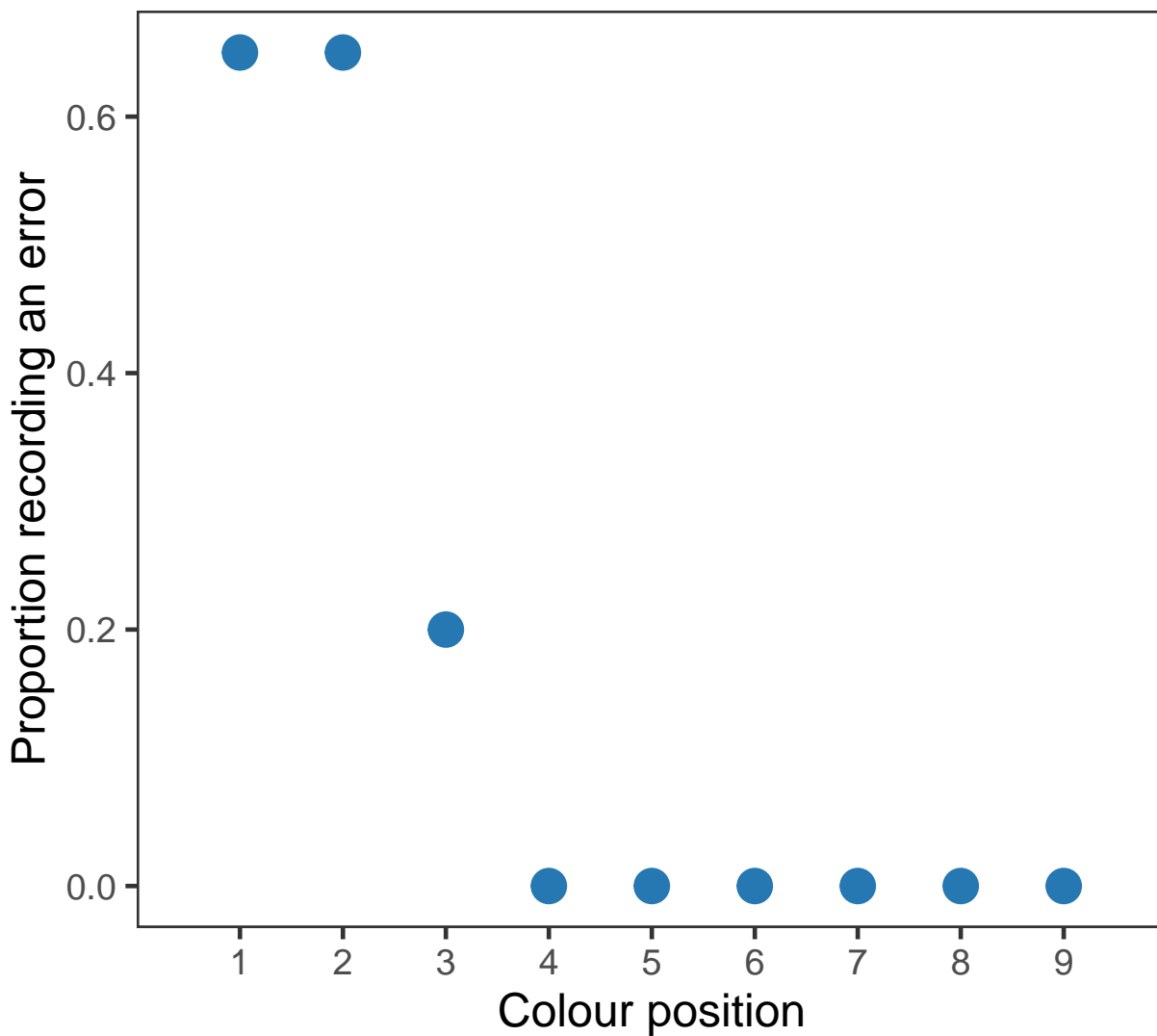

6 Plot 2: Positioning errors

```
p2 <- data %>%
    group_by(colour) %>%
    summarise(sum_errors = sum(error)) %>%
    mutate(perc_errors = sum_errors / 20) %>%
    ggplot(data = .) +
    aes(x = colour,
        y = perc_errors) +
    geom_point(size = 6,
```

```
              colour = '#2678B2') +
    labs(x = 'Colour position',
         y = 'Proportion recording an error') +
    scale_x_continuous(expand = c(0, 0),
                       limits = c(0, 10),
                       breaks = 1:9); p2
```
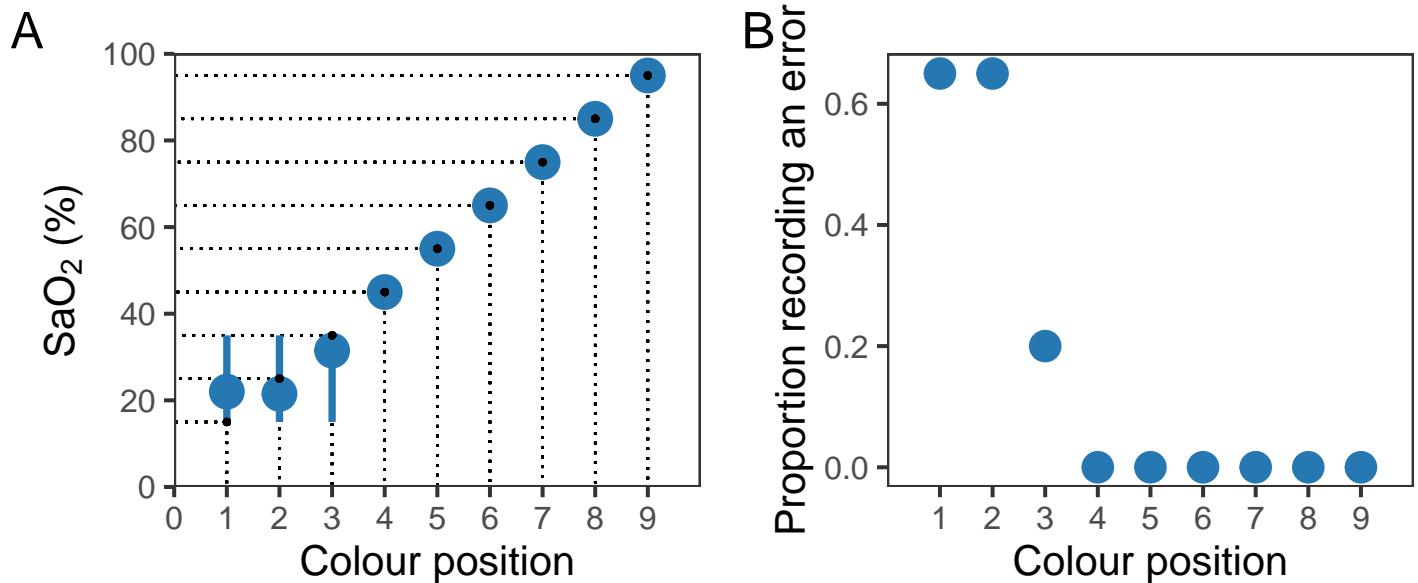

7 Patchwork

```
# Join plots
p3 <- p1 + p2 + plot_annotation(tag_levels = 'A')

# Output
p3
```

A

SaO$_2$ (%)

100
80
60
40
20
0

0 1 2 3 4 5 6 7 8 9
Colour position

B

Proportion recording an error

0.6
0.4
0.2
0.0

1 2 3 4 5 6 7 8 9
Colour position

```
# Save
ggsave(filename = 'figures/figure_3.png',
       plot = p3,
       width = 12,
       height = 6)
```

---

8   Session Information

```
sessionInfo()
```

```
## R version 3.6.3 (2020-02-29)
## Platform: x86_64-apple-darwin15.6.0 (64-bit)
## Running under: macOS Catalina 10.15.4
##
## Matrix products: default
## BLAS:   /Library/Frameworks/R.framework/Versions/3.6/Resources/lib/libRblas.0.dylib
## LAPACK: /Library/Frameworks/R.framework/Versions/3.6/Resources/lib/libRlapack.dylib
##
## locale:
## [1] en_US.UTF-8/en_US.UTF-8/en_US.UTF-8/C/en_US.UTF-8/en_US.UTF-8
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets  methods   base
##
## other attached packages:
##  [1] patchwork_1.0.0   forcats_0.5.0     stringr_1.4.0     dplyr_0.8.5
##  [5] purrr_0.3.3       readr_1.3.1       tidyr_1.0.2       tibble_3.0.0
##  [9] ggplot2_3.3.0.9000 tidyverse_1.3.0
##
## loaded via a namespace (and not attached):
##  [1] tidyselect_1.0.0 xfun_0.12        haven_2.2.0      lattice_0.20-38
##  [5] colorspace_1.4-1 vctrs_0.2.4      generics_0.0.2   htmltools_0.4.0
##  [9] yaml_2.2.1       utf8_1.1.4       rlang_0.4.5      pillar_1.4.3
## [13] withr_2.1.2      glue_1.3.2       DBI_1.1.0        dbplyr_1.4.2
## [17] modelr_0.1.6     readxl_1.3.1     lifecycle_0.2.0  munsell_0.5.0
## [21] gtable_0.3.0     cellranger_1.1.0 rvest_0.3.5      evaluate_0.14
```

```
## [25] labeling_0.3      knitr_1.28       fansi_0.4.1       broom_0.5.5
## [29] Rcpp_1.0.4        backports_1.1.5  scales_1.1.0      jsonlite_1.6.1
## [33] farver_2.0.3      fs_1.3.1         hms_0.5.3         digest_0.6.25
## [37] stringi_1.4.6     grid_3.6.3       cli_2.0.2         tools_3.6.3
## [41] magrittr_1.5      crayon_1.3.4     pkgconfig_2.0.3   ellipsis_0.3.0
## [45] xml2_1.3.0        reprex_0.3.0     lubridate_1.7.4   assertthat_0.2.1
## [49] rmarkdown_2.1     httr_1.4.1       rstudioapi_0.11   R6_2.4.1
## [53] nlme_3.1-145      compiler_3.6.3
```