

Compare target and observed temperatures.

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Goal

- Evaluate variance in `temp_mean` vs. `temp_target`

Set up

Install libraries

```
# install packages user might not have by replacing FALSE with TRUE

## load libraries
library(stats)
library(ggplot2)
library(ggpubr)
library(ggpmisc)
library(grid)
library(gridExtra)
library(GGally)
library(broom)
library(tidyverse)
library(viridisLite)
```

Load Data

```
load(file.path("input", "data.processing_2022-12-15.Rda"),
      verbose = TRUE)
```

```
## Loading objects:
##   motif_data
##   motif_data_40C
##   motif_stats
##   motif_stats_40C
##   bird_bill_data
```

```
motif_data
```

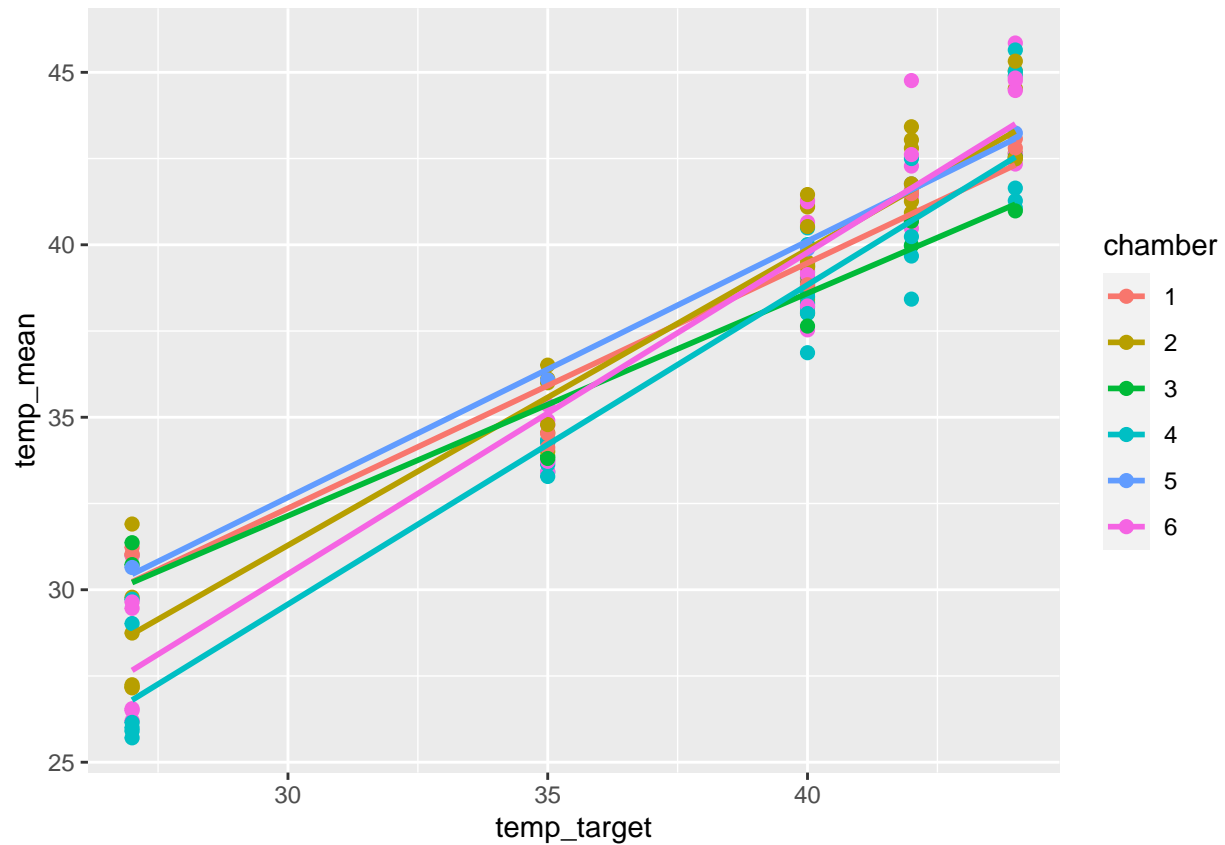
```
## # A tibble: 146 x 28
##   male round trial_round motif~1 motif~2 temp~3 humid~4 chamber date counter
##   <fct> <dbl>      <dbl>    <int>    <dbl>    <dbl>    <dbl> <fct>    <chr> <chr>
## 1 T229      1          1         0 0         45.8      NA 6      02/1~ KIM
## 2 T229      1          2        24 0.0131     42.3      NA 6      02/1~ KIM
## 3 T229      1          3       114 0.0622     40.7      NA 6      02/1~ KIM
## 4 T229      1          4       198 0.108      26.2      NA 6      02/1~ KIM
## 5 T229      1          5       315 0.172      34.9      NA 6      02/2~ KIM
## 6 T231      1          1         57 0.0431     42.8      NA 2      02/1~ RAS
## 7 T231      1          2          7 0.00529    45.0      NA 2      02/1~ RAS
## 8 T231      1          3         86 0.0650     41.1      NA 2      02/1~ KIM
## 9 T231      1          4         24 0.0181     27.2      NA 2      02/1~ RAS
## 10 T231     1          5       215 0.162      36.5      NA 2      02/2~ RAS
## # ... with 136 more rows, 18 more variables: test_order <int>,
## #   temp_target <dbl>, temp_median <dbl>, humidity_mean <dbl>, motif_rate <dbl>,
## #   mass <dbl>, n_obs_completed <lgl>, motif_count_plus_1 <int>,
## #   log_motif_count_plus_1 <dbl>, temp <dbl>, n_obs_round <int>, n_obs <int>,
## #   trial <int>, motif_prop_round <dbl>, weights <dbl>, svp <dbl>, vpd <dbl>,
## #   vpd_offset <dbl>, and abbreviated variable names 1: motif_count,
## #   2: motif_prop, 3: temp_mean, 4: humidity_mean
```

Process Data

Create Working Dataset

```
data <- motif_data %>% select(temp_target, temp_mean, chamber, date)
data %>% ggplot() +
  aes(x = temp_target, y = temp_mean, color = chamber) +
  geom_point(size = 2) +
  stat_smooth(method = "lm", se = FALSE)
```

```
## 'geom_smooth()' using formula = 'y ~ x'
```



```
temp_var_by_temp <- data %>%
  group_by(temp_target) %>%
  summarize(var = var(temp_mean, na.rm = TRUE),
            se_var = var * sqrt(2/n()))
```

```
print(temp_var_by_temp)
```

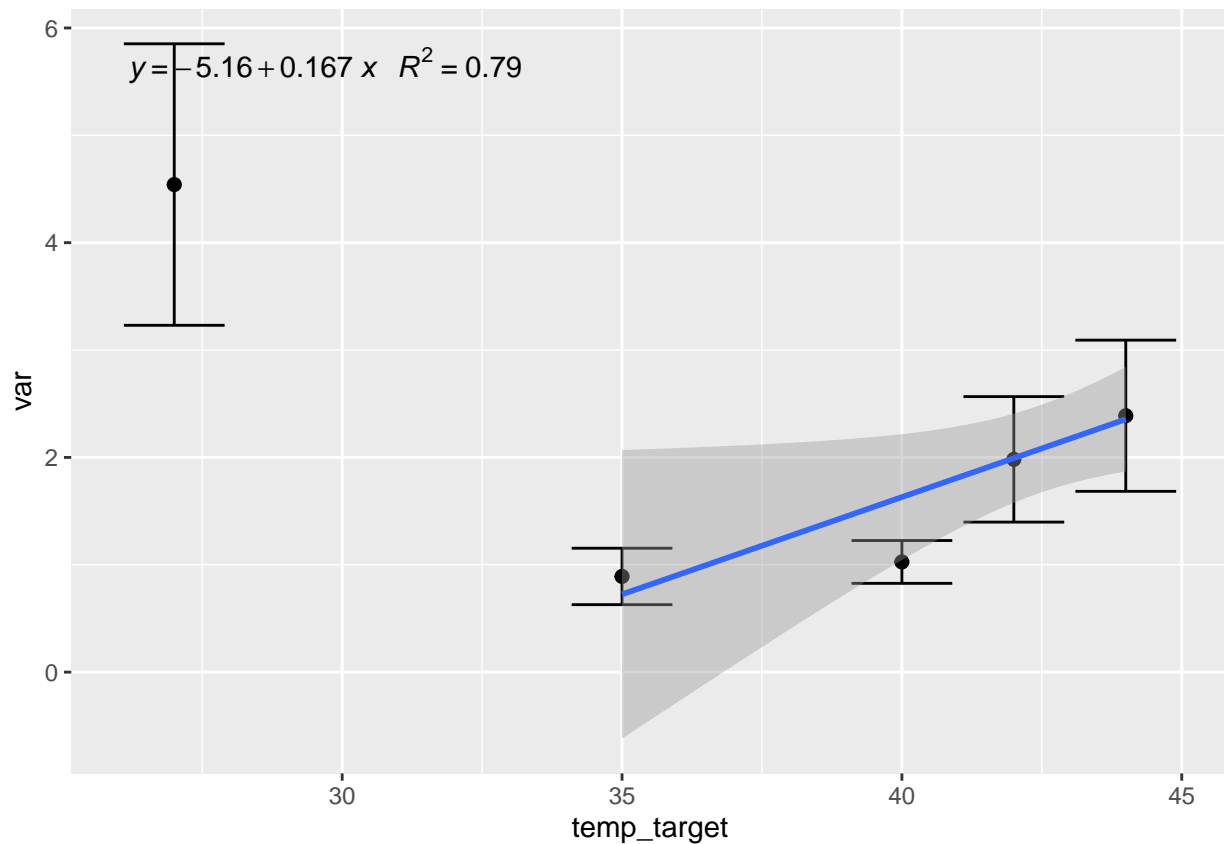
```
## # A tibble: 5 x 3
##   temp_target    var se_var
##       <dbl> <dbl> <dbl>
## 1         27 4.54  1.31
## 2         35 0.891 0.263
## 3         40 1.03  0.199
## 4         42 1.98  0.584
## 5         44 2.39  0.704
```

```
plt <- ggplot(temp_var_by_temp) +
  aes(x = temp_target,
      y = var,
      ymin = var - se_var,
      ymax = var + se_var) +
  geom_point(size = 2) +
  geom_errorbar() +
  stat_smooth(data = ~ .x %>% filter( temp_target > 27),
              method = "lm",
              aes(weight = (se_var)^2))
```

```
)

plt + stat_poly_eq(data = ~ .x %>% filter( temp_target > 27),
                  formula = y ~ x,
                  aes(label = paste(..eq.label.., ..rr.label.., sep = "~~~")),
                  parse = TRUE)
```

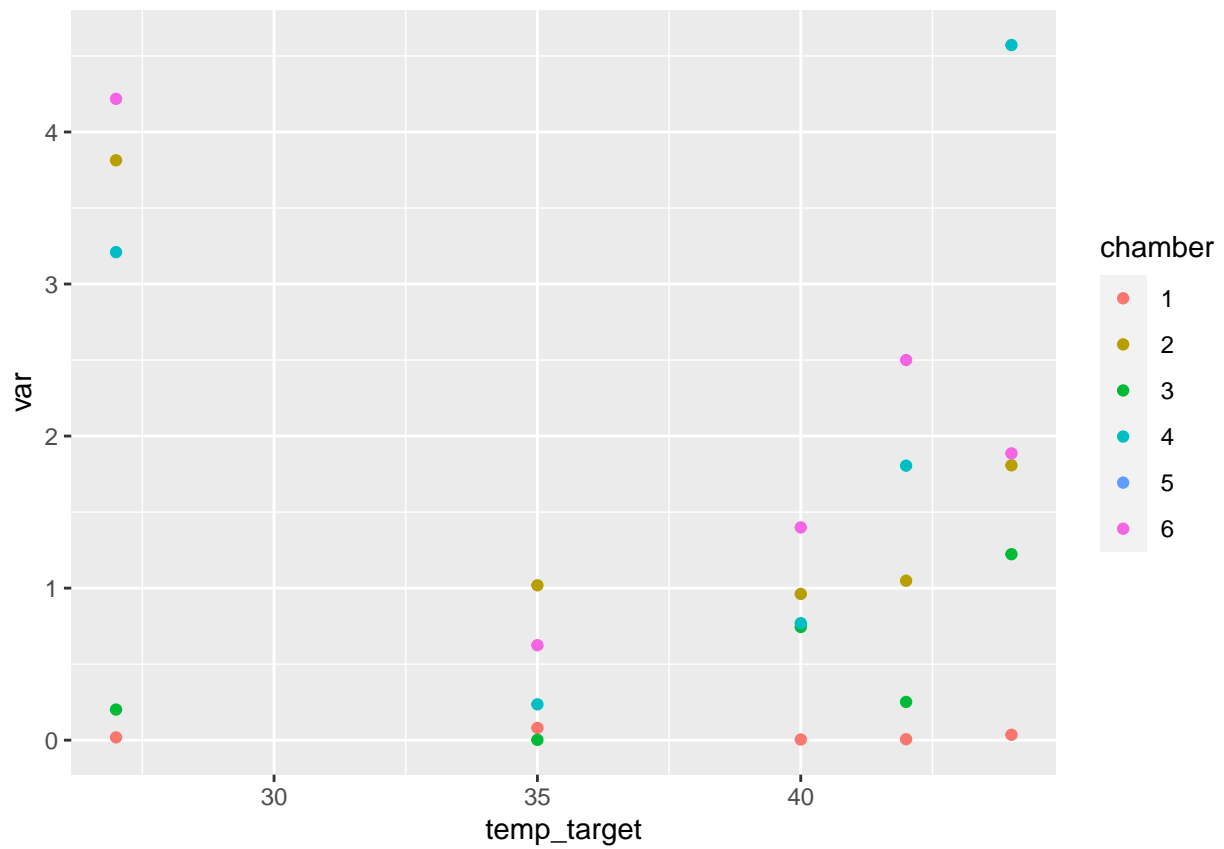
```
## 'geom_smooth()' using formula = 'y ~ x'
```



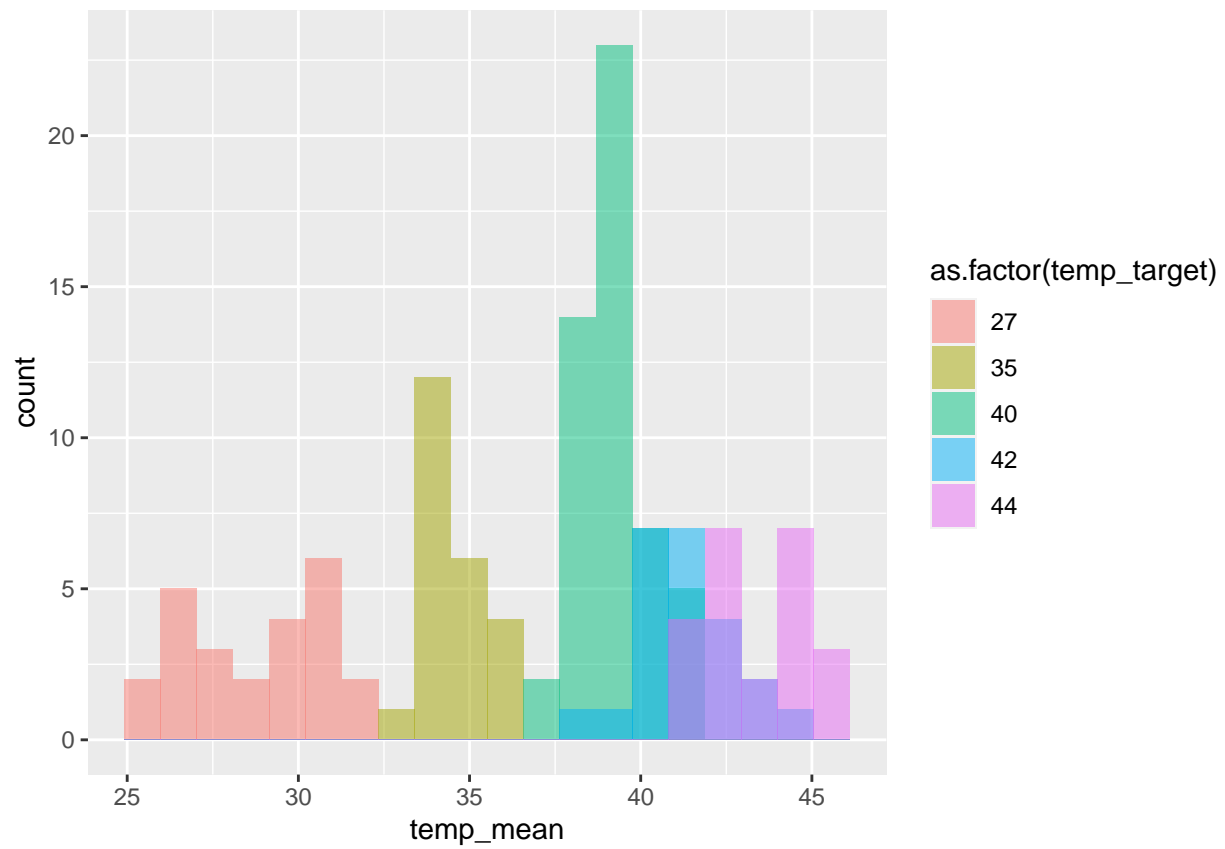
```
temp_var_by_temp_chamber <- data %>% group_by(temp_target, chamber) %>% summarize(var = var(temp_mean,
```

```
## 'summarise()' has grouped output by 'temp_target'. You can override using the
## '.groups' argument.
```

```
ggplot(temp_var_by_temp_chamber) +
  aes(temp_target, var, color = chamber) +
  geom_point()
```



```
ggplot(data, aes(x = temp_mean, fill = as.factor(temp_target))) +  
  geom_histogram(position = "identity", alpha = 0.5, bins = 20) # Draw overlay
```



```
#ggplot(data, aes(x = temp_mean, fill = as.factor(chamber))) + # Draw overlaying
#   geom_histogram(position = "identity", alpha = 0.5, bins = 20)
```