Terrible Christmas Plot

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```
knitr::opts_chunk$set(echo = TRUE)
library(showtext)
```

```
## Warning: package 'showtext' was built under R version 4.0.2
```

```
## Loading required package: sysfonts
```

```
## Warning: package 'sysfonts' was built under R version 4.0.2
```

```
## Loading required package: showtextdb
```

```
## Warning: package 'showtextdb' was built under R version 4.0.2
```

```
library(ggplot2)

# add a kitsch Christmas font (from Google: https://fonts.google.com/specimen/Mountains+of+Christmas)
font_add_google(name = "Mountains of Christmas")
showtext_auto()

# load a Christmassy colour palette (colours from here: https://www.schemecolor.com/christmas-party.php
xmas_cols <- c("#003F2E", "#018667", "#F8E19E", "#D5AD56", "#FFCA58", "#FF3213")

# load the simulated data
load("simulated_data.RData")
```

Simulate the dataset

This part of the process in not evaluated because it requires access to the initial dataset (that does not belong to me). I wanted to create a new dataset that had the same properties in terms of the relationship between variables and their variance at the within and between participant levels. To do this, I ran linear mixed effects models predicting each variable with random intercepts and slopes for participants. I then used these models to simulate a new dataset with the same properties. Finally, I created the participant-mean-centered variables for the plot.

```
set.seed(101)
# start by taking record ids and test days from the original dataset
simu <- data[!is.na(data$pmc_goal_qs) & !is.na(data$pmc_perc_correct),c("record_id", "day")]

# use the predict() function to predict new data with the same structure, relationships and variance of
simu$goal_qs <- scale(predict(lmer(data=data[!is.na(data$goal_qs) & !is.na(data$perc_correct),], goal_qs
simu$perc_correct <- predict(lmer(data=data[!is.na(data$goal_qs) & !is.na(data$perc_correct),], formula


# ID mean center variables
```

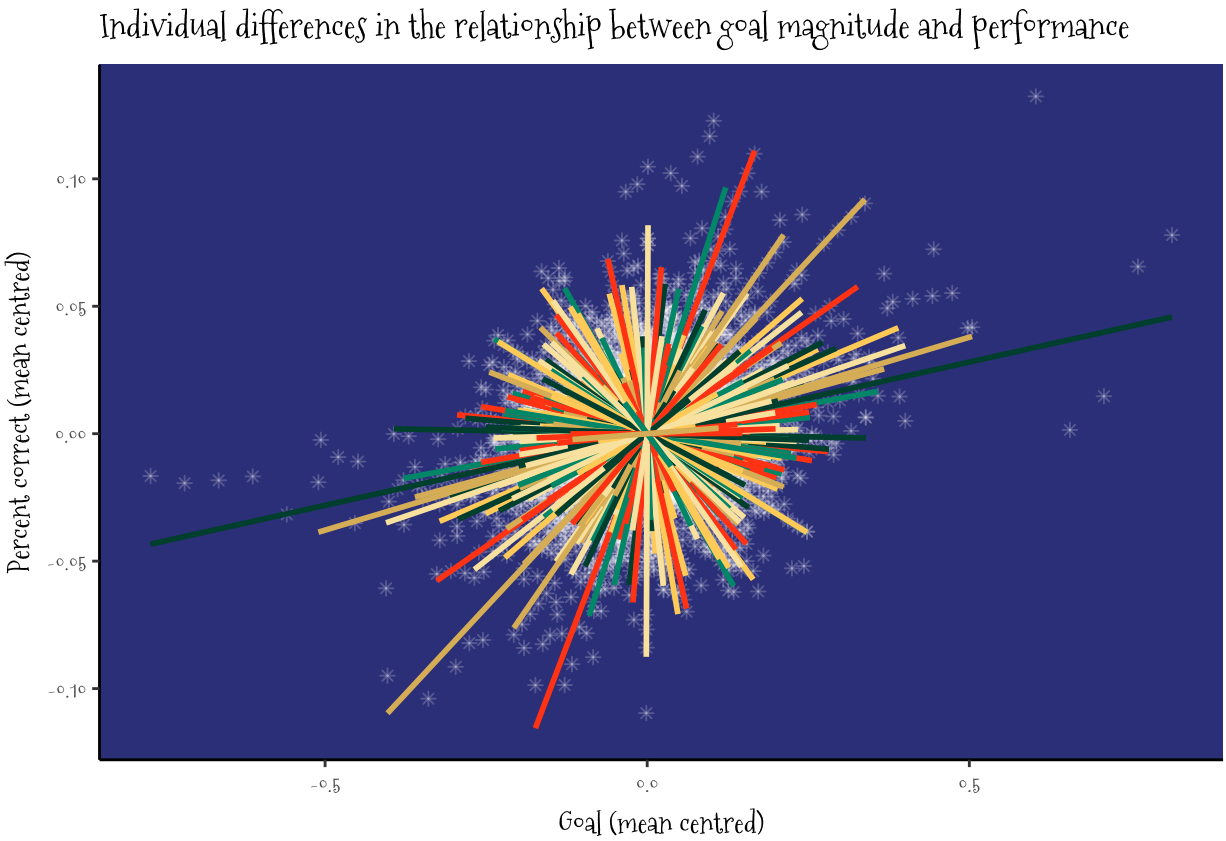
```
simu$perc_correct_pmc <- unlist(lapply(split(simu, simu$record_id), function(ppt_dat){ scale(ppt_dat$pe
simu$goal_qs_pmc <- unlist(lapply(split(simu, simu$record_id), function(ppt_dat){ scale(ppt_dat$goal_qs

save(simu, file = "simulated_data.RData")
```

Terrible plot

I made this plot while trying to visualise individual differences in the effect of goal magnitude on performance. As a standard ggplot it looked like a nice pompom, but was not very useful for understanding the data. I thought I would have a bit of fun adding a Christmas theme for the terrible plots competition.

```
ggplot(data=simu,
       aes(x=goal_qs_pmc,
           y=perc_correct_pmc,
           col=factor(record_id)))+
  geom_point(col="white",
             alpha=0.2,
             shape=8)+ # shape 8 is an asterisk shape that looks a bit like a snowflake
  stat_smooth(method="lm",
              se=F,
              formula = y~x)+
  scale_color_manual(guide=F,
                     values = sample(xmas_cols, 345, T))+ # there aren't enough colours in the palette
  theme_classic()+
  theme(panel.background = element_rect(fill = "#2B2F77"),
        text = element_text(family = "Mountains of Christmas"))+
  labs(x="Goal (mean centred)",
       y="Percent correct (mean centred)",
       title="Individual differences in the relationship between goal magnitude and performance")
```




```
ggsave("terrible_plot.png")
```

```
## Saving 6.5 x 4.5 in image
```