Lab 7

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In this lab, we are going to be looking at weekly averages that are visualized at the team, position, and player level. The first thing we will need to do is determine the week number, out of 52, that the day is in. This is easily accomplished using the `week()` function in the lubridate library, which is done for you, along with loading in the data, below.

Question 1

For this first question, I have given you three processed data frames, `team_dat`, `position_dat`, and `player_dat`, which are aggregated at the team, position, and player level, respectively, for the wellness data. Your task is to visualize these three data sets appropriately. I want to see a bar plot (or equivalent, feel free to be creative) with the associated 95% error bars for each data set. In addition, because it is excessive and hard to look at a plot with every single player from the `player_dat` data set, I only want the plot to be for players `A`, `B`, and `C`, which will require you to use `player_dat %>% filter(str_detect(Athlete, "A|B|C"))` inside of the `ggplot()` function. For your plots, be sure to

- Use the `facet_wrap()` layer in ggplot as needed,
- Be sure to fill your bars, and to manually choose your color options inside the `scale_fill_manual()` option (Google this if you are unsure),
- When you use `facet_wrap()`, be sure to correctly title each subplot using the `labeller` option inside of `facet_wrap()`,
- Do not include a legend if it is redundant (Google `guides` for ggplot).

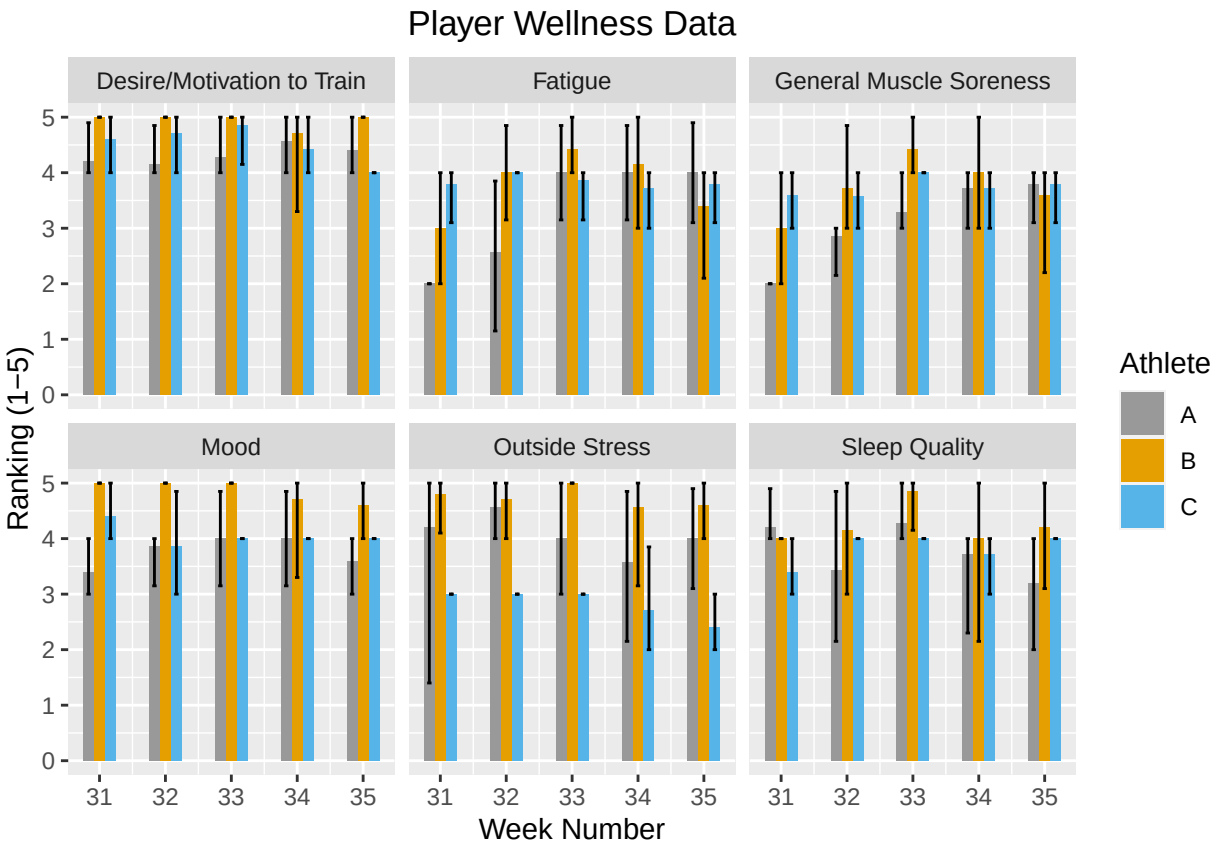
NOTE: for this question, I will be grading you on the aesthetic quality of your plot. If you really want to impress me, be sure to use a color blind friendly color scale in the `scale_fill_manual()` layer.

```
team_dat = dat %>%
  select(week_num, Sleep_Quality:Desire_Motivation_to_Train) %>%
  pivot_longer(-week_num, names_to = 'Metric', values_to = 'Values') %>%
  group_by(week_num, Metric) %>%
  summarise_at(vars(Values), list(mean = ~ mean(., na.rm = T),
                                  lower = ~ quantile(.,probs = 0.025),
                                  upper = ~ quantile(.,probs = 0.975)))


position_dat = dat %>%
  select(week_num, Position, Sleep_Quality:Desire_Motivation_to_Train) %>%
  pivot_longer(-c(week_num, Position), names_to = 'Metric', values_to = 'Values') %>%
  group_by(week_num, Metric, Position) %>%
  summarise_at(vars(Values), list(mean = ~ mean(., na.rm = T),
                                  lower = ~ quantile(.,probs = 0.025),
```

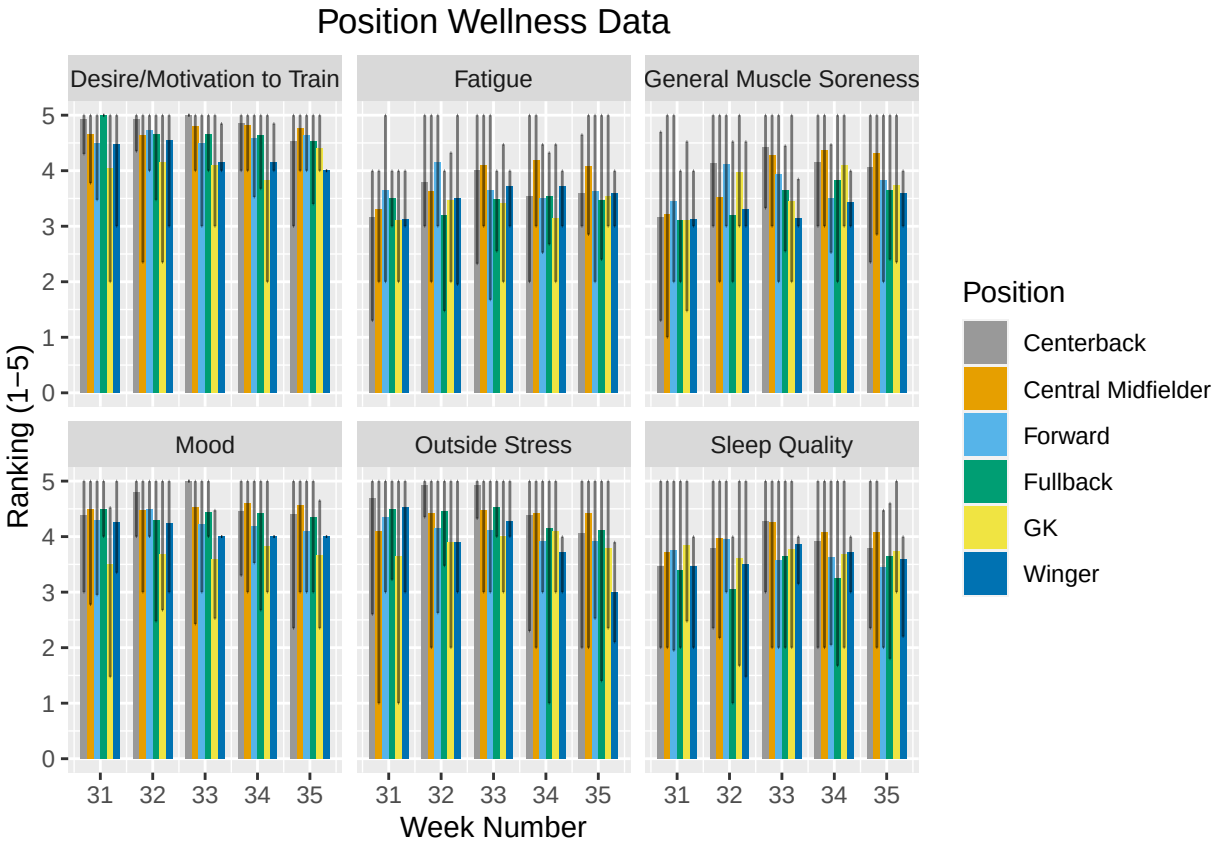
```
                                  upper = ~ quantile(.,probs = 0.975)))


player_dat = dat %>%
  select(week_num, Athlete, Sleep_Quality:Desire_Motivation_to_Train) %>%
  pivot_longer(-c(week_num, Athlete), names_to = 'Metric', values_to = 'Values') %>%
  group_by(week_num, Metric, Athlete) %>%
  summarise_at(vars(Values), list(mean = ~ mean(., na.rm = T),
                                  lower = ~ quantile(.,probs = 0.025),
                                  upper = ~ quantile(.,probs = 0.975)))
```

Answer

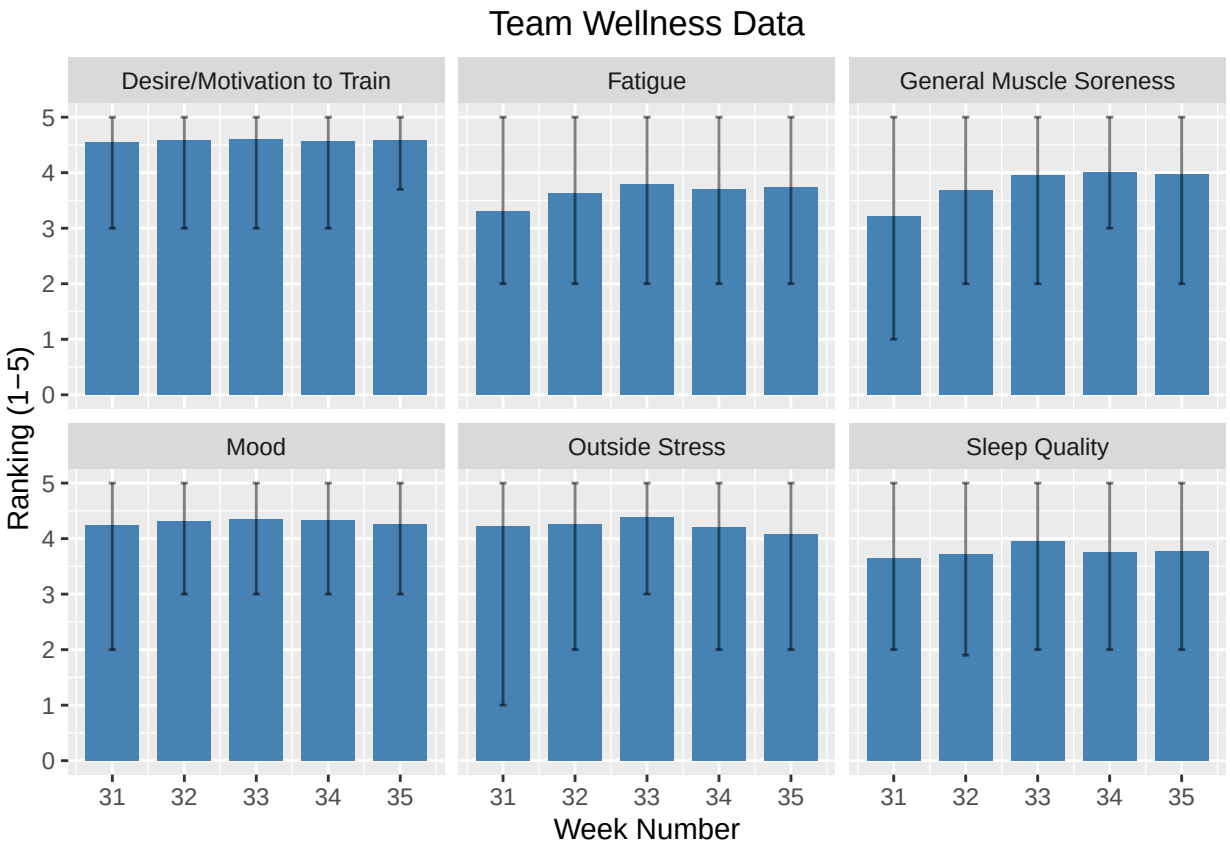
```
#Color blind pallette to impress you
cbbPalette <- c("#999999", "#E69F00", "#56B4E9", "#009E73", "#F0E442", "#0072B2", "#D55E00", "#CC79A7")

#Player
ggplot(player_dat %>% filter(str_detect(Athlete, "A|B|C")),
    aes(x= week_num, y= mean, fill= Athlete, width=.5)) +
  geom_bar(stat= 'identity', position= position_dodge(), width= .75) +
  geom_errorbar(aes(ymin= lower, ymax= upper), width= .2, position=             position_dodge(0.5)) +
  facet_wrap(~Metric, labeller = labeller(Metric = c(
    'Desire_Motivation_to_Train' = 'Desire/Motivation to Train',
    'Outside_Stress' = 'Outside Stress', 'Sleep_Quality' = 'Sleep Quality',
    'General_Muscle_Soreness' = 'General Muscle Soreness', 'Mood' =             'Mood', 'Fatigue' = 'Fa
  xlab('Week Number') +
  ylab('Ranking (1-5)') +
  ggtitle('Player Wellness Data') +
  theme(plot.title = element_text(hjust = 0.5)) +
  scale_fill_manual(values= cbbPalette)
```




```
#Position
ggplot(position_dat, aes(x= week_num, y= mean, fill= Position, width=.75)) +
  geom_bar(stat= 'identity', position= position_dodge(), width= .75) +
  geom_errorbar(aes(ymin= lower, ymax= upper), width= .1, alpha= .5,            position= position_dodg
  facet_wrap(~Metric, labeller = labeller(Metric = c(
    'Desire_Motivation_to_Train' = 'Desire/Motivation to Train',
    'Outside_Stress' = 'Outside Stress', 'Sleep_Quality' = 'Sleep Quality',
    'General_Muscle_Soreness' = 'General Muscle Soreness', 'Mood' =             'Mood', 'Fatigue' = 'Fa
  xlab('Week Number') +
  ylab('Ranking (1-5)') +
  ggtitle('Position Wellness Data') +
  theme(plot.title = element_text(hjust = 0.5)) +
  scale_fill_manual(values= cbbPalette)
```




```
#Team
ggplot(team_dat, aes(x= week_num, y= mean, width=.75)) +
  geom_bar(stat= 'identity', position= position_dodge(), fill= 'steelblue',      width= .75) +
  geom_errorbar(aes(ymin= lower, ymax= upper), width= .1, alpha= .5,             position= position_dodg
  facet_wrap(~Metric, labeller = labeller(Metric = c(
    'Desire_Motivation_to_Train' = 'Desire/Motivation to Train',
    'Outside_Stress' = 'Outside Stress', 'Sleep_Quality' = 'Sleep Quality',
    'General_Muscle_Soreness' = 'General Muscle Soreness', 'Mood' =              'Mood', 'Fatigue' = 'Fa
  xlab('Week Number') +
  ylab('Ranking (1-5)') +
  ggtitle('Team Wellness Data') +
  theme(plot.title = element_text(hjust = 0.5))
```



Question 2

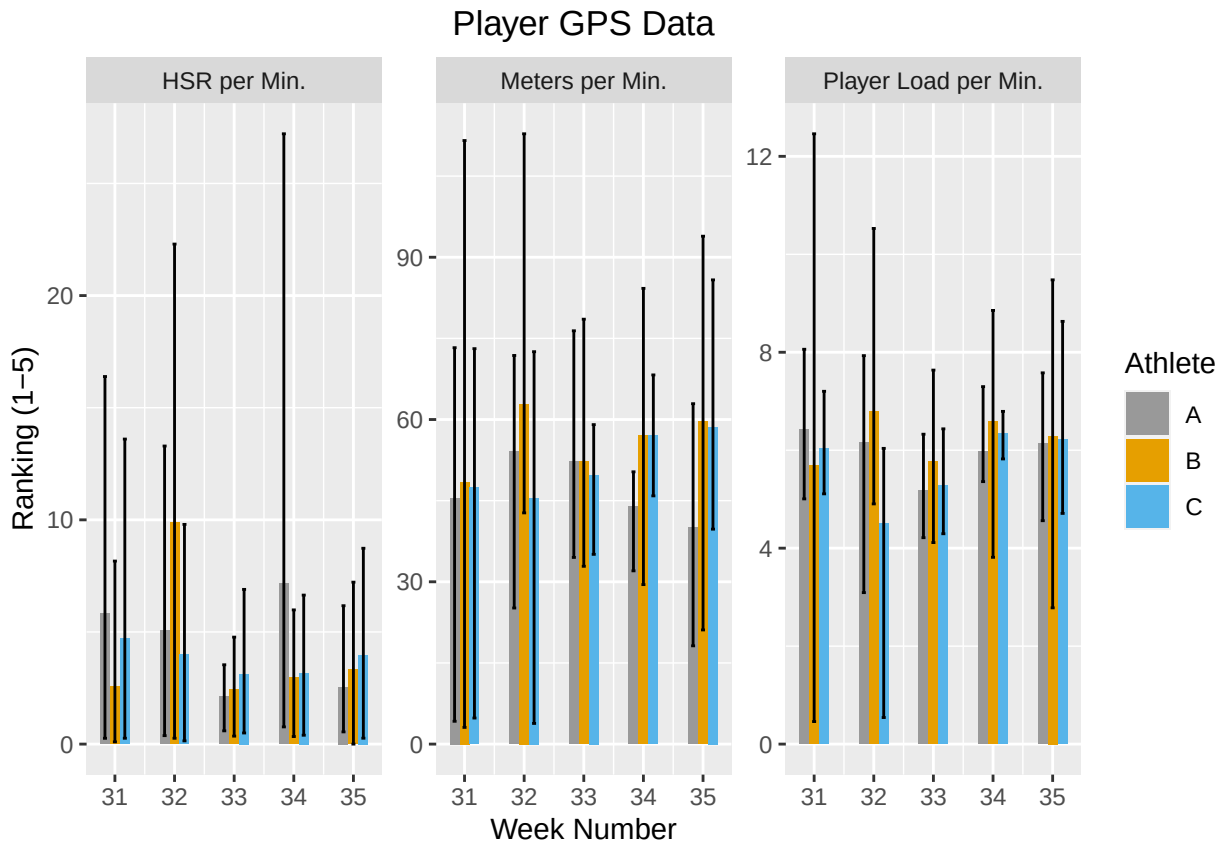
Repeat question 1, except for data pertaining to players GPS metrics. Again, you are going to be graded on the quality of your figures. Feel free to be as creative as you like, just make sure your figures convey the information appropriately.

```
team_dat = dat %>%
  select(week_num, Meters_per_Min., PlayerLoad_per_Min., HSR_per_Min.) %>%
  filter(complete.cases(.)) %>%
  filter(PlayerLoad_per_Min. != '#DIV/0!') %>%
  mutate_at(vars(Meters_per_Min.:HSR_per_Min.), ~ as.numeric(.)) %>%
  pivot_longer(-week_num, names_to = 'Metric', values_to = 'Values') %>%
  group_by(week_num, Metric) %>%
  summarise_at(vars(Values), list(mean = ~ mean(., na.rm = T),
                                  lower = ~ quantile(.,probs = 0.025),
                                  upper = ~ quantile(.,probs = 0.975)))



position_dat = dat %>%
  select(week_num, Position, Meters_per_Min., PlayerLoad_per_Min., HSR_per_Min.) %>%
  filter(complete.cases(.)) %>%
  filter(PlayerLoad_per_Min. != '#DIV/0!') %>%
  mutate_at(vars(Meters_per_Min.:HSR_per_Min.), ~ as.numeric(.)) %>%
  pivot_longer(-c(week_num, Position), names_to = 'Metric', values_to = 'Values') %>%
  group_by(week_num, Metric, Position) %>%
```

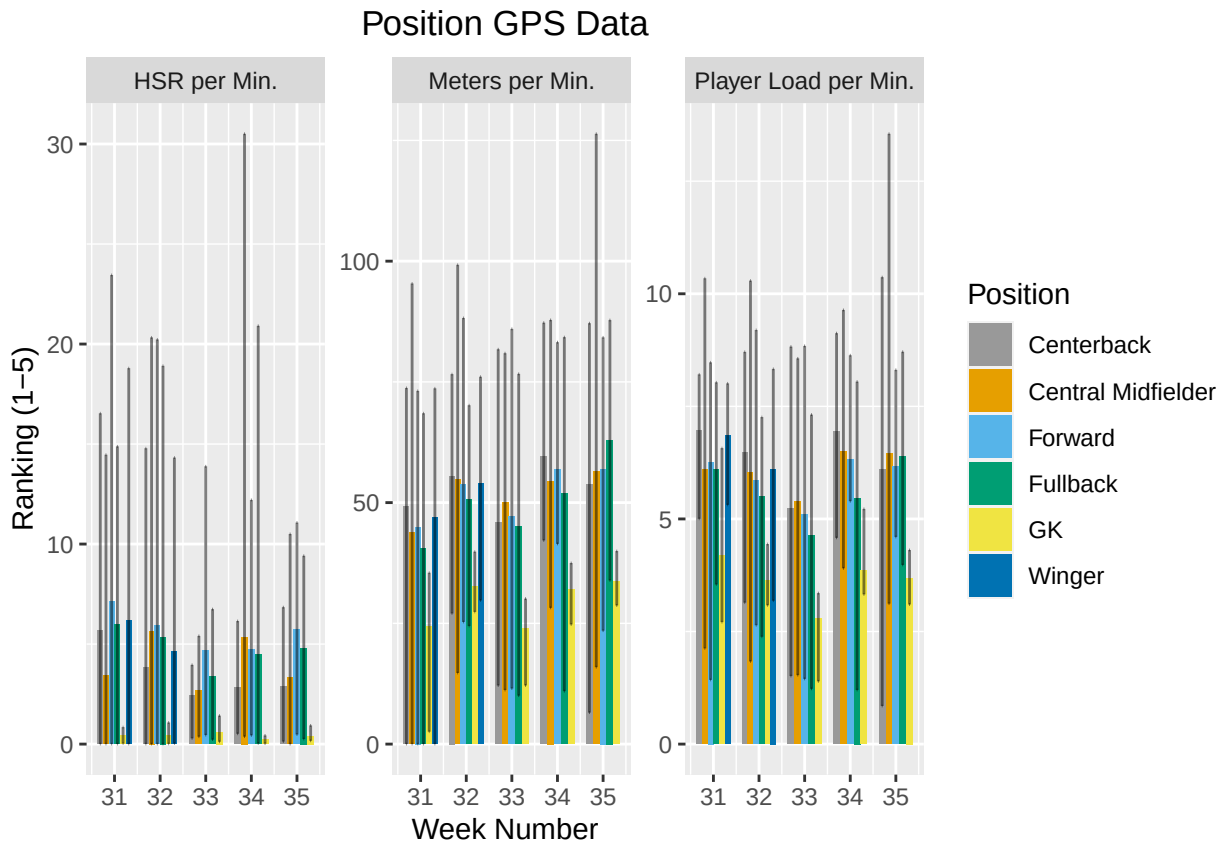
```
  summarise_at(vars(Values), list(mean = ~ mean(., na.rm = T),
                                  lower = ~ quantile(.,probs = 0.025),
                                  upper = ~ quantile(.,probs = 0.975)))


player_dat = dat %>%
  select(week_num, Athlete, Meters_per_Min., PlayerLoad_per_Min., HSR_per_Min.) %>%
  filter(complete.cases(.)) %>%
  filter(PlayerLoad_per_Min. != '#DIV/0!') %>%
  mutate_at(vars(Meters_per_Min.:HSR_per_Min.), ~ as.numeric(.)) %>%
  pivot_longer(-c(week_num, Athlete), names_to = 'Metric', values_to = 'Values') %>%
  group_by(week_num, Metric, Athlete) %>%
  summarise_at(vars(Values), list(mean = ~ mean(., na.rm = T),
                                  lower = ~ quantile(.,probs = 0.025),
                                  upper = ~ quantile(.,probs = 0.975)))
```

Answer

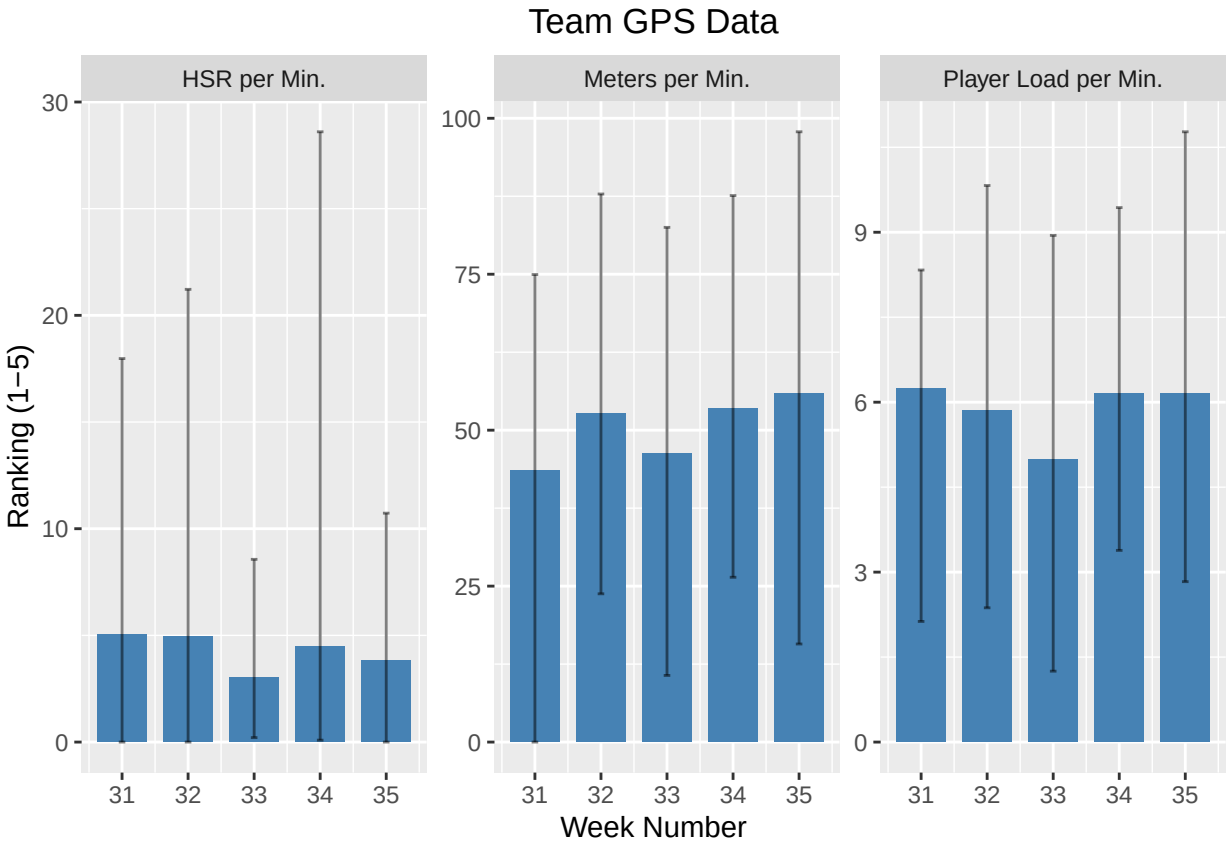
```
#Player
ggplot(player_dat %>% filter(str_detect(Athlete, "A|B|C")),
    aes(x= week_num, y= mean, fill= Athlete, width=.5)) +
  geom_bar(stat= 'identity', position= position_dodge(), width= .75) +
  geom_errorbar(aes(ymin= lower, ymax= upper), width= .2, position=             position_dodge(0.5)) +
  facet_wrap(~Metric, scales= 'free', labeller = labeller(Metric = c(
    'HSR_per_Min.' = 'HSR per Min.',
    'Meters_per_Min.' = 'Meters per Min.',
    'PlayerLoad_per_Min.' = 'Player Load per Min.'))) +
  xlab('Week Number') +
  ylab('Ranking (1-5)') +
  ggtitle('Player GPS Data') +
  theme(plot.title = element_text(hjust = 0.5)) +
  scale_fill_manual(values= cbbPalette)
```




```
#Position
ggplot(position_dat, aes(x= week_num, y= mean, fill= Position, width=.75)) +
  geom_bar(stat= 'identity', position= position_dodge(), width= .75) +
  geom_errorbar(aes(ymin= lower, ymax= upper), width= .1, alpha= .5,            position= position_dodg
  facet_wrap(~Metric, scales= 'free', labeller = labeller(Metric = c(
    'HSR_per_Min.' = 'HSR per Min.',
    'Meters_per_Min.' = 'Meters per Min.',
    'PlayerLoad_per_Min.' = 'Player Load per Min.'))) +
  xlab('Week Number') +
  ylab('Ranking (1-5)') +
  ggtitle('Position GPS Data') +
  theme(plot.title = element_text(hjust = 0.5)) +
  scale_fill_manual(values= cbbPalette)
```




```
#Team
ggplot(team_dat, aes(x= week_num, y= mean, width=.75)) +
  geom_bar(stat= 'identity', position= position_dodge(), fill= 'steelblue',      width= .75) +
  geom_errorbar(aes(ymin= lower, ymax= upper), width= .1, alpha= .5,             position= position_dodg
  facet_wrap(~Metric, scales= 'free', labeller = labeller(Metric = c(
    'HSR_per_Min.' = 'HSR per Min.',
    'Meters_per_Min.' = 'Meters per Min.',
    'PlayerLoad_per_Min.' = 'Player Load per Min.'))) +
  xlab('Week Number') +
  ylab('Ranking (1-5)') +
  ggtitle('Team GPS Data') +
  theme(plot.title = element_text(hjust = 0.5))
```



Question 3

Now we discuss the figures you have created. Answer the following questions in the space below.

1. **How do weekly trends in team averages compare to individual position averages?** Weekly trends for team averages are much more stable. Just because we don't see much of a change in Mood over the weeks for our wellness data, doesn't mean certain positions/players aren't seeing fluctuations themselves. For instance, the team average mood is stable over weeks 31-35. Position wise, centerbacks saw an increase in mood ranking during weeks 32 and 33, while all others remained relatively stable. I

2. **Why is it useful to looks at the data on 3 different levels (team, position, individual)? Explain you answer.** Going with the answer to number one, a coach may be interested in digging a little deeper into certain postitions and players. Graphing at all three levels just gives more information, which can be used to answer more specific questions. For example, say a coach wants to examine sleep quality over these weeks. A quick glance at the team data, and the coach notices sleep quality overall is pretty stable. However, he wants to take a more careful look. Using the positions wellness graph, the coach sees fullbacks are generally on the lower end of sleep quality out of the whole team. This is especially pronounced in weeks 32 and 34. With this info, a coach may choose to check on the fullbacks.

3. **Based on the data, in one paragraph or less, summarize your key takeaways from the data for a coaching staff** Team fatigue and especially soreness are climbing, building from several weeks of training. Additionally, players are reporting a lot of outside stress. Despite this, player motivation and mood holds at good levels. Practice intensity, based on Meterage and Player Load, has been stable. Lastly, sleep quality has been only okay with players ranking it around a 3.5 across all weeks. It is possible that less outside stress could improve sleep quality.