

Dataframe: sleep.csv

Build inside your Sleep Notebook for this activity.

At the point where we left off:

1. Create a fourth level header called “Probe the effect of sex at 1 SD above and below the mean of sleep.”

Add a code chunk. First request the mean and standard deviation of sleep:

```
mean(slp_mix$sleep)
sd(slp_mix$sleep)
```

Note what they are. Using paper and pencil, and the results of regression model mix2, write the equation that relates sex to life satisfaction when sleep is one standard deviation below the mean, and the equation that relates sex to life satisfaction when sleep is one standard deviation above the mean (i.e, you will have 2 equations).

1 SD ABOVE: $\hat{Y}_i = \text{_____} + \text{_____} * \text{female}_i$

1 SD BELOW: $\hat{Y}_i = \text{_____} + \text{_____} * \text{female}_i$

2. Continue on in the same code chunk. Use the mutate function to create two new versions of the sleep variable, one centered at one standard deviation above the mean (call this sleep_1above), and one centered at one standard deviation below the mean (call this sleep_1below). Once created, refit the mix2 regression model twice – once swapping sleep for sleep_1above, and once swapping sleep for sleep_1below. How do the results of these models compare to the equations that you wrote above?
3. Make a line plot that relates participant sex to life satisfaction at 1 SD below the mean of sleep, at the mean of sleep, and at 1 SD above the mean of sleep.

```
#### Probe the effect of sex at 1 SD above and below the mean of sleep
```

```
```{r}

mean(slp_mix$sleep)
sd(slp_mix$sleep)

slp_mix <- mutate(slp_mix, sleep_1above = sleep - (mean(sleep) + sd(sleep)),
 sleep_1below = sleep - (mean(sleep) - sd(sleep)))

mix2_above <- lm(data=slp_mix, lifesat ~ female + sleep_1above + female*sleep_1above)
ols_regress(mix2_above)

mix2_below <- lm(data=slp_mix, lifesat ~ female + sleep_1below + female*sleep_1below)
ols_regress(mix2_below)

```
```

```
#### Plot the results with sex on the x-axis
```

```
```{r}

predgrid_mix_switch <- slp_mix %>%
 group_by(female.f) %>%
 data_grid(sleep_m = c(-12.14, 0, 12.14),
 female) %>%
 ungroup() %>%
 mutate(sleep_m.f = factor(sleep_m, levels = c(-12.14, 0, 12.14),
 labels = c("1 SD Below Mean", "Mean", "1 SD Above Mean")))

predictions_mix_switch <- predict(mix2, predgrid_mix_switch, interval = "confidence") %>%
 as_data_frame()

adjmeans_mix_switch <- cbind(predgrid_mix_switch, predictions_mix_switch) %>%
 mutate(sleep = sleep_m + mean(slp_mix$sleep))

ggplot(adjmeans_mix_switch, aes(x = female.f, y = fit, group = sleep_m.f, color = sleep_m.f)) +
 geom_ribbon(aes(ymin = lwr, ymax = upr, color = NULL), alpha = .4, fill = "grey60") +
 geom_line(size = 1) +
 guides(color = guide_legend("Sleep Efficiency")) +
 labs(title = "Does the effect of sex on life satisfaction differ by sleep efficiency?",
 x = "Sex", y = "Life Satisfaction")

```
```