

# Moderation

QAC 201

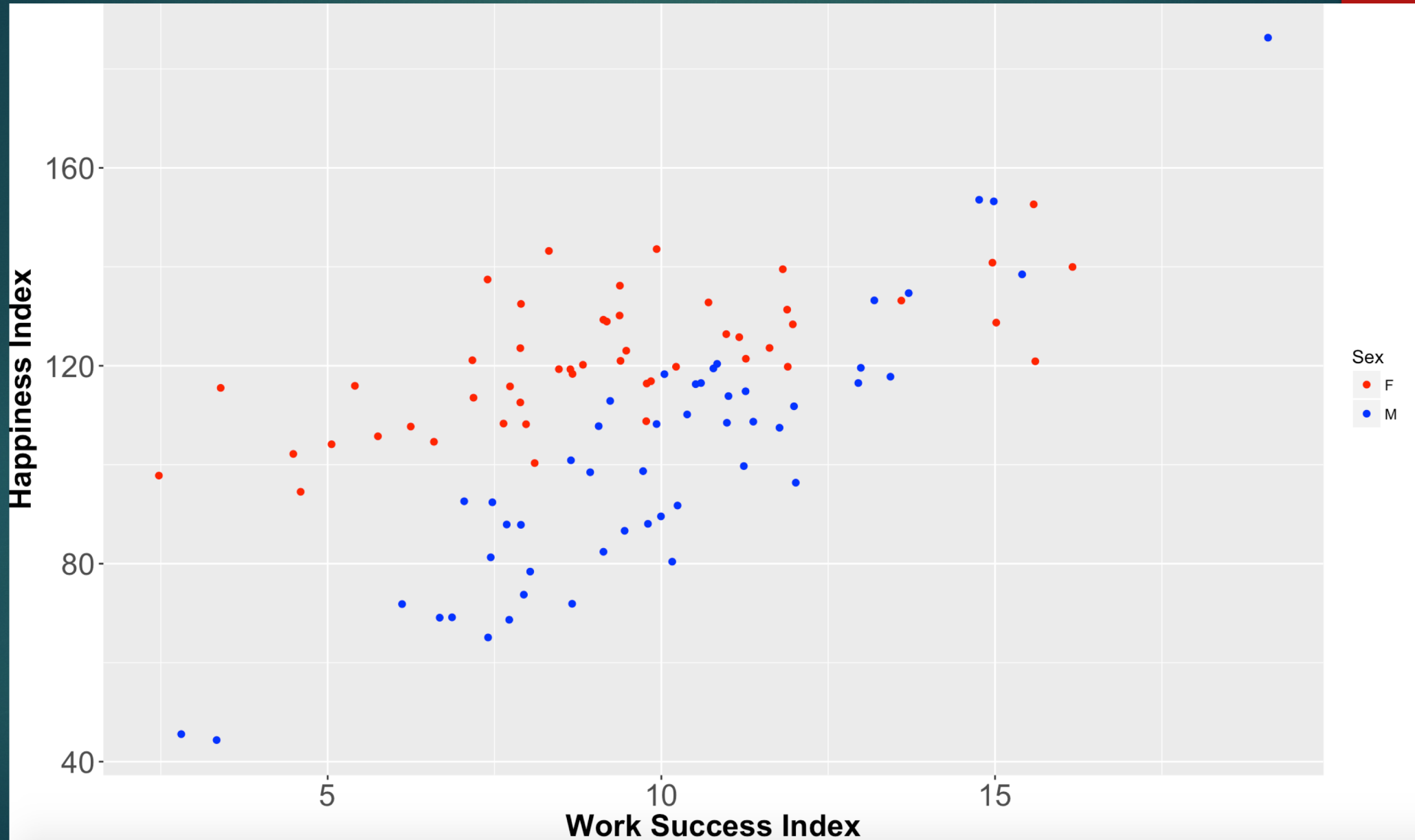


# Example: Happiness and Self-Perceived Work Success

- Suppose we wish to examine how people rate their work success with how happy they feel for males and females. (Both happiness and work success are quantitative).



Begin by visualizing the association:





It appears that females (in this sample) are generally happier than males. Perhaps we want to see how both relate to happiness.

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	71.086	4.505	15.779	< 2e-16	***
work_success	5.452	0.442	12.336	< 2e-16	***
sexM	-24.674	2.672	-9.232	6.1e-15	***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1


- Predicted Happiness = 71 + 5.452 (Work Success) – 24.673 (Male)
- When examining the association between work success and happiness, for each additional point on the work success index, the happiness index is expected to increase by 5.452 points on average (Beta=5.452,  $p < 0.001$ ) when holding sex constant.
- In addition, males have an average happiness score that is 24.674 points lower than females (Beta=-24.674,  $p\text{-value} < 0.001$ ) when holding work success constant.



The model on the previous slide assumes that predictions of happiness are found with these two lines:








Suppose we hypothesized that the relationship between work success and happiness varies between males and females. That is, perhaps we believe that work success is more (or less) important for males than it is for females in predicting happiness.

Graphically, we can see the following....







- 
- ▶ **We can run a regression separately for males and females and compare our findings:**
  - ▶ Suppose for females we found:
  - ▶ Work success is positively and significantly associated with happiness (Beta=2.8, p-value<0.001)
  - ▶ Suppose for males we found:
  - ▶ Work success is positively and significantly associated with happiness (Beta=8.4, p-value<0.001)



We can more efficiently test whether sex moderates the relationship between work success and happiness by running a Multiple Linear Regression with an interaction term. This will test whether the slopes between the two groups are the same:

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	95.5062	4.5851	20.830	< 2e-16	***
work_success	2.8178	0.4694	6.003	3.44e-08	***
sexM	-78.7640	6.9327	-11.361	< 2e-16	***
work_success:sexM	5.5855	0.6835	8.172	1.23e-12	***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

- Predicted Happiness =  $95.5062 + 2.8178(\text{WorkSuccess}) - 78.7640 (\text{Male}) + 5.5855 (\text{WorkSuccess} \times \text{Male})$ .
- Females: Predicted Happiness =  $95.5062 + 2.8178 (\text{Work Success})$
- Males: Predicted Happiness =  $16.7422 + 8.4033 (\text{Work Success})$