

Interaction – *the effect of one factor depends on level of the second factor & may be different or change across levels of the second factor*

To better understand interaction, we'll first consider some made-up scenarios with treatment means (then return to worksheet)

Made-up Scenario 1:

		FLOOR SPACE			
FEEDER		high	low	<i>difference</i>	
TROUGH	high	63	58	5	← no difference between these
SPACE	low	60	—		

No interaction (“absolutely no interaction” extreme case)

Effect of 1st factor, floor space high/low, is the same for both levels high/low of the 2nd factor, feeder trough space

Made-up Scenario 2:

		FLOOR SPACE			
FEEDER		high	low	<i>difference</i>	
TROUGH	high	63	58	5	← Looks like a “big” difference ← $5 - 59 = -54$ between these differences
SPACE	low	60	1	59	
	<i>difference</i>	3	57		

Interaction

- *Effect of 1st factor, floor space high/low, seems to drastically change over the levels (high/low) of the 2nd factor, trough space*

- *“interaction implies a significantly large difference in the differences”*

Made-up Scenario 3:

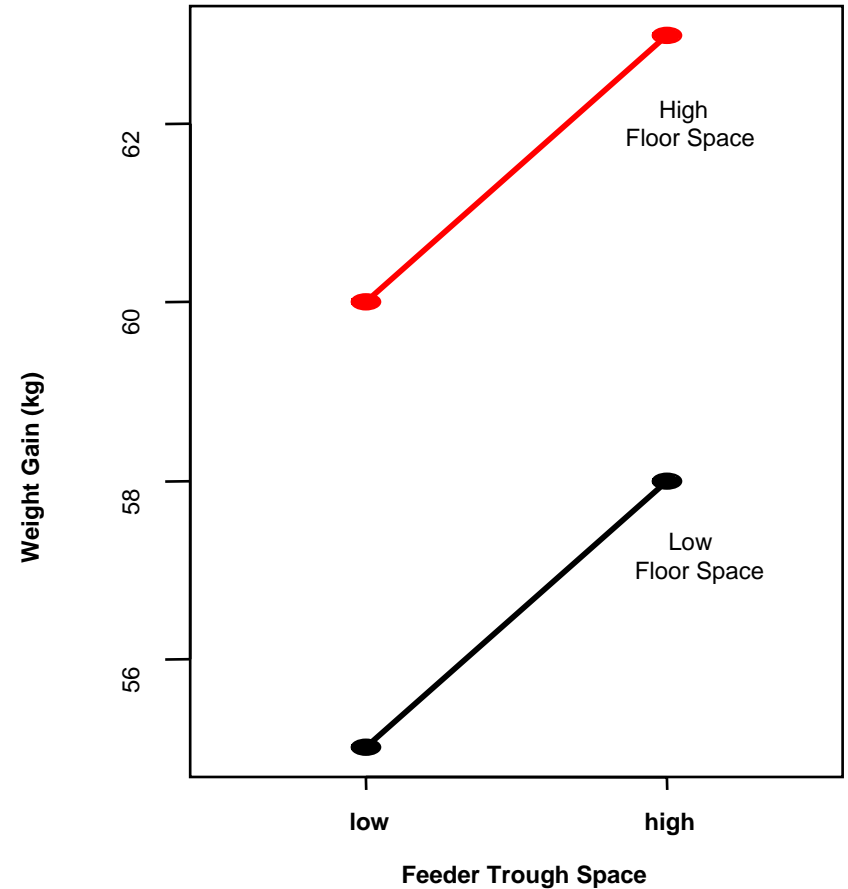
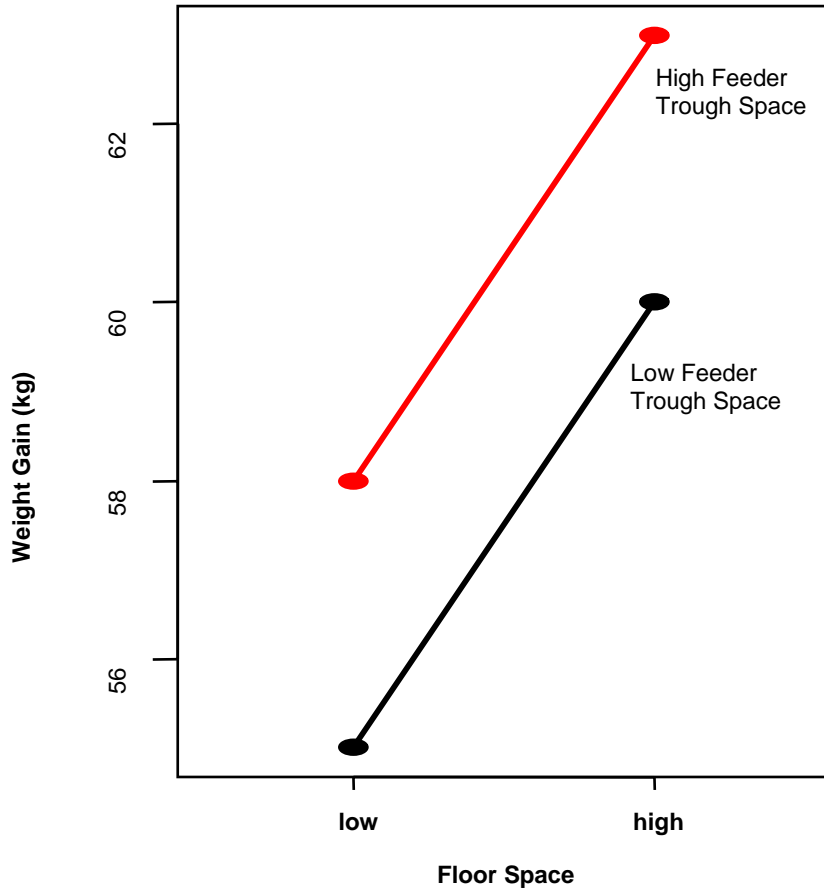
		FLOOR SPACE			
FEEDER		high	low	<i>difference</i>	
TROUGH	high	63	58	5	← Looks like a “small” difference ← $5 - 4 = 1$ between these & a small difference could be due just to chance variability in the data
SPACE	low	60	56	4	
	<i>difference</i>	3	2		

Perhaps NO real Interaction

- *Effect of 1st factor (floor space) may not truly depend on the level of the 2nd factor (feeder trough space)*
- *The observed differences in data may not be significant but only due to chance variation (experimental error)*

Interaction plots: Made-up scenario 1

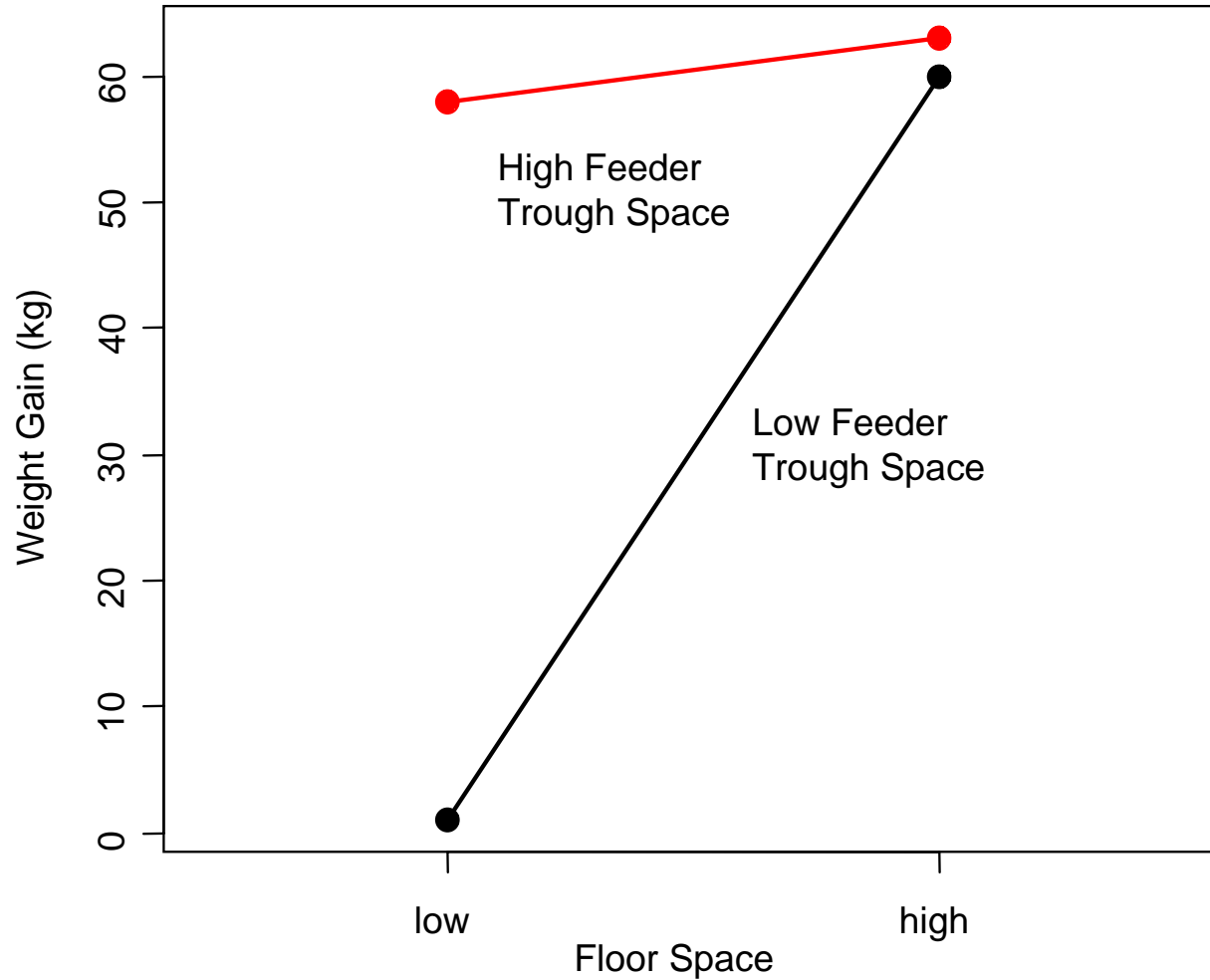
		FLOOR SPACE	
FEEDER TROUGH SPACE		high	low
high		63	58
low		60	55



With absolutely **no interaction**, there are **parallel lines** in interaction plot

Interaction plots: Made-up scenario 2

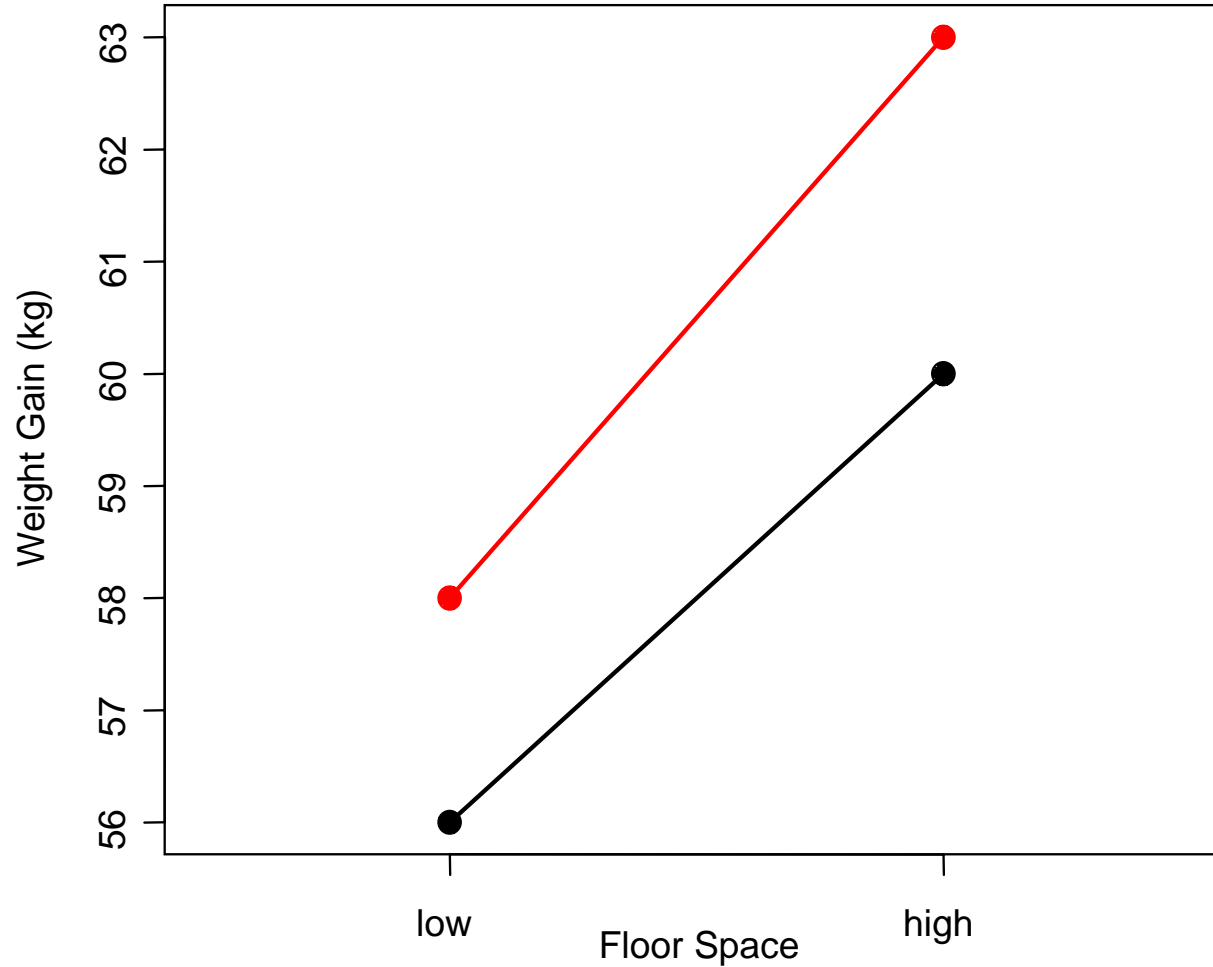
FEEDER TROUGH SPACE		FLOOR SPACE	
high	low	high	low
63	58	63	58
60	1	60	1



With strong **interaction**, **non-parallel lines** appear in interaction plot

Interaction plots: Made-up scenario 3

		FLOOR SPACE	
FEEDER TROUGH SPACE		high	low
high		63	58
low		60	56



Sometimes the non-parallel lines are just due to chance, no significant interaction & non-parallelism due to natural variability

