

## Answers to Exercises: Module 4

These questions are based on the Witness data set.

1. The following model regresses Perceived Accuracy on Sex of the Witness. Results include the regression coefficients table and the marginal means for each group.

### *Variable Coding*

	Value	Label	N
SEX_WITN	1	Male	117
	2	Female	103

### *Regression Coefficients*

Dependent Variable: ACCURATE

Variable	B	se	t	p
Intercept	4.175	.109	38.273	.000
Witness's Sex=1	.082	.150	.546	.586
Witness's Sex=2	0	.	.	.

### *Overall Mean*

Dependent Variable: ACCURATE

Mean	se
4.216	.075

### *Means by Witness's Sex*

Dependent Variable: ACCURATE

Witness's Sex	Mean	se
1 Male	4.256	.102
2 Female	4.175	.109

What is the coding scheme for Sex of the Witness in the data set?

Which category is the reference group? How do you know? What was its original coding in the data set?

*1 is Male*

*2 is Female*

*Females are the reference group, originally coded 2. I know because in the Regression Coefficients table, the Witness's Sex=1 has a coefficient and Witness's Sex=2 does not.*

What is the intercept? What does it tell you?

*The intercept is 4.175. It is the mean value of Perceived Accuracy for Female Witnesses.*

What is the coefficient for Witness's Sex=1? For each, write a single sentence that explains what it means.

*The coefficient for Witness's Sex=1 (Males) is .082. It is the difference in the mean Perceived Accuracy between Male and Female witnesses.*

What is the overall mean of Perceived Accuracy? What is the mean Perceived Accuracy score for each Sex of Witness? How do these means compare to the regression coefficients?

*The overall mean is 4.216.*

*The mean for Male witnesses is 4.256.*

*The mean for Female witnesses is 4.175, the same as the coefficient for the intercept.*

*The difference between the two means is the same as the coefficient for Witness's Sex=1.*

2. The following adds MEMORY to the model. Interpret each of the coefficients.

## Regression Coefficients

Dependent Variable: ACCURATE

Variable	B	se	t	p
Intercept	1.524	.268	5.674	.000
Witness's Sex=1	-.040	.123	-.323	.747
Witness's Sex=2	0	.	.	.
Memory	.611	.058	10.468	.000

*Intercept: If Memory= 0, which is never does, since it's a 1-7 scale, the mean Perceived Accuracy of Female witnesses is 1.524. Therefore, it is simply the intercept for the Female witnesses.*

*Sex\_Witn=1: At any value of memory, male witnesses have a mean Perceived Accuracy that is .04 points lower than female witnesses.*

*The overall effect of Perceived Memory on Perceived Accuracy for both sexes of witnesses is .611. This means that for each one-unit change in Perceived Memory, the average Perceived Accuracy increases by .611.*

3. The following model uses MEMORY centered at its mean. Do the results change? How? Interpret each of the coefficients.

## Regression Coefficients

Dependent Variable: ACCURATE

Variable	B	se	t	p
Intercept	4.242	.089	47.476	.000
Witness's Sex=1	-.040	.123	-.323	.747
Witness's Sex=2	0	.	.	.
Memory Centered	.611	.058	10.468	.000

*Only the intercept changes, to 4.24. It is now the mean value of Perceived Accuracy for female witnesses at the mean value of perceived memory.*

4. The following model adds HONEST and SENIOR\_S to the model, both centered at their means. Now interpret each of the coefficients.

## Regression Coefficients

Dependent Variable: ACCURATE

Variable	B	se	t	p
Intercept	4.219	.086	48.932	.000
Witness's Sex=1	.039	.120	.327	.744
Witness's Sex=2	0	.	.	.
Memory Centered	.550	.062	8.937	.000
Honest Centered	.233	.070	3.324	.001
Time w/Seniors Centered	.030	.022	1.312	.191

*Intercept: 4.219 is the average Perceived Accuracy for female witnesses at the average values of memory, honesty, and time spent with seniors at school.*

*Witness's Sex=1: .039 is the average difference between male and female witnesses. This difference is not significant.*

*Mem\_Cen: .550 is the effect of Perceived Memory on Perceived Accuracy, after accounting for sex, honesty, and time spent with seniors at school. For each one unit difference in Perceived Memory, the average perceived accuracy increases by .55.*

*Hon\_Cen: .233 is the effect of Perceived Honesty on Perceived Accuracy, after accounting for sex, memory, and time spent with seniors at school. For each one unit difference in Perceived Honesty, the average perceived accuracy increases by .233.*

*SENS\_Cen: .03 is the effect of time spent with seniors at school on Perceived Accuracy, after accounting for sex, honesty, and time perceived memory. This effect is not significant.*

## 5. Add an interaction term between SEX\_WITN and MEMORY.

### Regression Coefficients

Dependent Variable: ACCURATE

Variable	B	se	t	p
Intercept	4.216	.086	48.795	.000
Witness's Sex=1	.038	.120	.320	.750
Witness's Sex=2	0	.	.	.
Memory Centered	.514	.080	6.436	.000
Honest Centered	.221	.072	3.054	.003
Time w/Seniors Centered	.030	.023	1.346	.180
Witness's Sex*Memory	.084	.117	.716	.474

Is it significant? How does it change the meaning of the other parameters in the model? Reinterpret each of your parameter estimates with the interaction in the model. What does it tell you about the relationship between perceptions of a witness' memory, their sex, and how accurate they seem to be?

*It is not significant. Despite this, it changes the meaning of the coefficients for Sex of Witness and Memory, even though the numbers don't change much from the previous model.*

*The difference between the two sexes, .038, now only applies at the mean of memory. Likewise, the effect of memory, .514, is only the effect for the reference group. .084, the coefficient for the interaction, is the difference in slopes for the males compared to the females.*