

Psychology 1305: Experimental Child Psychology: Language
Regression, Part 3: Multiple Regression

The point of this enterprise is ultimately to include more regressors, or independent variables, or X's in the equation:

$$\hat{Y} = b_0 + b_1X_1 + b_2X_2 + \dots + b_nX_n$$

Some of these Xs may themselves be intercorrelated. The resulting R square will tell us how well all the X's together predict Y. Each b will tell us how well and how much each X predicts Y, *independent of the other X's*. The diagrams below (Fig 5.2 from TF) describe this idea, and describe several different regression techniques. We will be using the technique shown in b below, though we also need to understand c for the Hoff & Naigles, 2002, paper.

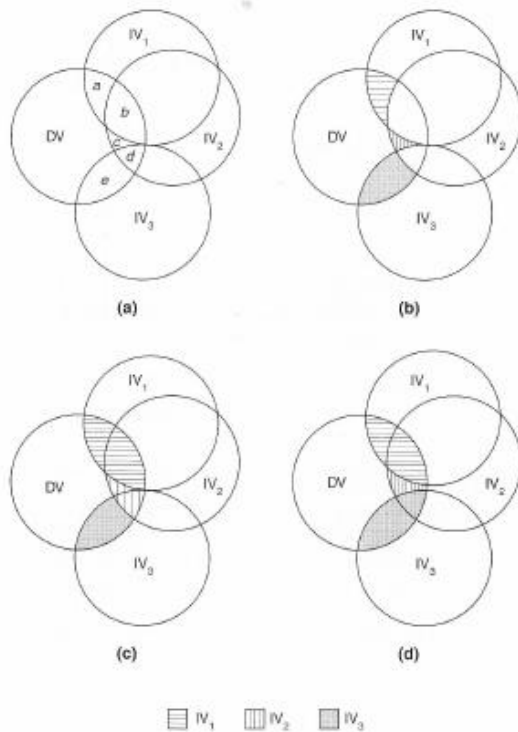


FIGURE 5.2 Venn diagrams illustrating (a) overlapping variance sections; and allocation of overlapping variance in (b) standard multiple regression, (c) sequential regression, and (d) statistical (stepwise) regression.

1. Open up Stats_RegressionHW2b_data_2184.sav from the last homework.
2. Re-run your regression from the previous homework ($Y = \text{Grammar}$, $X = \text{Verbal Memory}$). Review b_1 , β_1 , and Adjusted R^2 . Interpret each of them again here for review, and note whether they are statistically significant.

ANSWER

3. Notice there are several other variables in this file. How might each of the other variables relate to grammar comprehension as independent variables? This is a conceptual question.

ANSWER

4. Create a correlation matrix with Grammar, Verbal Memory, Tapping, Birthweight and Mother's Education. (Analyze>Correlate>Bivariate, then enter all variables.) Fill in the values for the upper correlation matrix below.

	VMem	Tap	BW	MoEd
Gram				
VMem				
Tap				
BW				
MoEd				

5. Interpret each correlation, incorporating its significance into your interpretation.

ANSWER

6. Run another regression with Verbal Memory, Tapping, Birthweight, and Mother's Education as independent variables. What is the adjusted R^2 ? What are each b and β ? Are any coefficients significant?

ANSWER

7. Interpret each β , taking significance into account.

ANSWER

8. Did β for Verbal Memory change between the two regressions? If so, explain why.

ANSWER

9. Did adjusted R^2 change? Explain.

ANSWER

10. Were there any variables that had a significant first order correlation (r) with Grammar, but did not appear as a significant predictor in the multiple regression? If so, why did that happen?

ANSWER