

## 16. Writing about Interactions

### PROBLEM SET

1. For each of the listed figures from *Writing about Multivariate Analysis, 2nd Edition*, (i) name the independent and dependent variables involved in the interaction, and state (ii) whether the interaction is in terms of direction or magnitude of association (or both), and (iii) whether the interaction is ordinal or disordinal.
  - a. Figure 17.4 (p. 377) adapted from Pottick et al. (1999)
  - b. Figure 16.1 (p. 342)
  - c. Figure 16.2 (p. 343) adapted from Miller and Rodgers (2008)
  - d. Figure 18.1 (p. 401) from Krivo et al. (2009)
  - e. Figure 18.2 (p. 405) adapted from Phillips et al. (2004)
  
2. For figures 16.4d, e, and f on p. 345 in *Writing about Multivariate Analysis, 2nd Edition*, think of a topic for which that shape association makes sense. E.g., for figure 16.4f, a relationship with an upward sloping curve between an independent variable (IV) and dependent variable (DV) for one group, coupled with a downward sloping curve between the same IV and DV for another group. List the independent and dependent variables involved, and the context in which such a relationship might exist.

Table 16A summarizes results of Carr's (2004) analysis of relations among dependence on a spouse, gender, and psychological adjustment to the death of a spouse.

**TABLE 16A.** OLS regressions of self-esteem at wave 2, overall and by gender, changing lives of older couples (CLOC) study, 1987–1994

Variable	Total sample		Women		Men	
	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error
Widow	-0.51*	0.24	0.25 <sup>†</sup>	0.15	1.67	1.22
Female	-0.60**	0.22				
<i>Interaction: female_widow</i>	0.70**	0.26				
Emotional dependence on spouse			-0.35**	0.13		
<i>Interaction: emotional dependence on spouse_widow</i>			0.34**	0.15		

(continued)

TABLE 16A. (continued)

Variable	Total sample		Women		Men	
	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error
Dependence on spouse for homemaking tasks					2.67*	1.35
<i>Interaction: dependence on spouse for homemaking tasks_widow</i>					-2.92*	1.39
Dependence on spouse for home maintenance and financial tasks					-1.30*	0.55
<i>Interaction: dependence on spouse for home maintenance and financial task_widow</i>					1.58**	0.59
Intercept	2.13	0.76*	0.54	0.79	1.75	2.12
$R^2$ adjusted	0.19		.024		0.19	
Unweighted $N$	297		217		80	

Source: Adapted from Deborah Carr, "Gender, Preloss Marital Dependence, and Older Adults' Adjustment to Widowhood," *Journal of Marriage and the Family* 66 (2004): 220–35, table 2.

Models also control for wave 1 well-being, demographic characteristics, and number of months between wave 1 and 2 interviews. Dependence measures assessed at wave 1.

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; †  $p < 0.10$

### 3. Using the results for the total sample in table 16A

- Create a table to show predicted self-esteem for each of the four possible combinations of gender and widowhood status.
- Create a chart to portray that association.
- Write a short description of the association between gender, widowhood status, and predicted self-esteem using the GEE approach.

### 4. Using the results for women in table 16A

- Create a spreadsheet to calculate the net effect of the interaction between emotional dependence on spouse, widowhood status, and predicted self-esteem, working from the online spreadsheet template for continuous by categorical interactions, or using the guidelines in appendix D of *Writing about Multivariate Analysis, 2nd Edition*. Both self-esteem and emotional dependence are in standardized units (mean = 0, standard deviation [SD] = 1). Allow emotional dependence to vary from -1.0 to 1.0 SD in your calculations.
- Design a chart to portray this pattern following the guidelines in chapters 6 and 16.
- Write a short description of the association between emotional dependence on spouse, widowhood status, and predicted self-esteem using the GEE approach.

- d. Explain why there isn't a dummy variable for "female" in the stratified models.

Miller and Rodgers (2008) estimated a model of monthly earnings with an interaction between gender and marital status in Taiwan. The estimated coefficients for variables involved in the interaction are shown in table 16B, and the associated variance-covariance matrix in table 16C.

**TABLE 16B.** Estimated coefficients from a model of monthly earnings NT\$, Taiwan, 1992

Variable	Coefficient	Standard error
Intercept	-21,022.2	1,897.62
Man	3,204.9	201.34
Married	-1,594.7	213.30
Man_married	4,771.2	248.65

Model also controls for work experience, tenure on the job, educational attainment, urban residence, supervisory occupation, and gender composition of the respondent's occupation.

**TABLE 16C.** Variance-covariance matrix for the estimated coefficients in table 16B

	Man	Married	Man_married
Man	40,538.61		
Married	20,834.16	45,497.59	
Man_married	-34,094.11	-36,700.40	61,826.53

5. Perform the following tasks using the information in tables 16B and 16C and the techniques explained in chapter 16 and the associated online materials for *Writing about Multivariate Analysis, 2nd Edition* and the associated references.
- Calculate the difference in monthly earnings for married men compared to unmarried women (the reference category).
  - Calculate the standard error of the compound coefficient for married men from the information in the variance-covariance matrix.
  - Calculate the 95% confidence interval around the point estimate of the difference in earnings for each marital status/gender combination compared to the reference category (unmarried women).
  - Conduct and write up results of statistical tests for differences in earnings between the following pairs of groups, explaining direction, magnitude, and statistical significance:
    - Married versus unmarried women
    - Married versus unmarried men
  - Optional: Create a spreadsheet to conduct steps a through c, working from the online spreadsheet template for categorical by categorical interactions, or the guidelines in appendix D of *Writing about Multivariate Analysis, 2nd Edition*.