14

Writing about Multivariate Models

PROBLEM SET

1. Fauth et al. (2004) studied the effects of a residential mobility experiment, comparing outcomes of low-income adults in public housing who moved to low-poverty neighborhoods to those who stayed in their original, high-poverty neighborhoods. "Movers" were chosen by lottery from among those who applied for the program. Their results are summarized in tables 14A (bivariate statistics) and 14B (multivariate model results). Use those data to answer questions 1 through 3.

Table 14A. Individual background characteristics, neighborhood, and housing characteristics of movers and stayers, Yonkers Residential Mobility Program, 1994–1995

	Residential status			
	Movers ($n = 173$)	Stayers ($n = 142$)	Total ($n = 315$)	χ^2 or F[a]
Background characteristics				
Age (mean years)	36.69	34.07	35.51	6.45**
Female	97%	96%	97%	0.41
Latino (ref. = black)	31%	25%	28%	1.07
At least high school education	67%	53%	61%	6.62**
Female household head	76%	85%	80%	4.39*
Mean # children in household	1.72	2.01	1.85	6.04*
Neighborhood/housing				
Danger (3 items)	0.26	1.29	0.72	144.11***
# of victimizations in past year (1 item)	0.12	0.32	0.21	9.21*
Disorder (5 items)	0.15	1.41	0.72	796.17***
Cohesion (4 items)	0.62	0.40	0.52	43.48***
Resources (5 items)	3.05	2.89	2.98	4.90*
Housing quality (5 items)	0.20	0.54	0.35	54.40***

Source: Adapted from Rebecca C. Fauth, Tama Leventhal, and Jeanne Brooks-Gunn, "Short-term Effects of Moving from Public Housing in Poor to Middle-class Neighborhoods on Low-income, Minority Adults' Outcomes," *Social Science and Medicine* 59 (2004): 2271–84, table 1, *http://www.sciencedirect.com/science*.

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

[a] $\chi 2$ statistic reported for difference in categorical variable between movers and stayers; *F*-statistic for difference in continuous variable.

1. Answer the following questions based on the information in table 14A:
   a. Did the random assignment succeed in equalizing the background characteristics of movers and stayers? Write a paragraph summarizing the similarities and differences in background characteristics between those two groups.
   b. Did neighborhood and housing characteristics differ according to residential status (e.g., for movers versus stayers)? Write a paragraph generalizing these findings.
   c. What do these statistics suggest about the need for multivariate models of these outcomes by residential status? Explain your reasoning.

2. Write a paragraph describing the results in table 14A, using the principles in chapter 14 of *Writing about Multivariate Analysis* for building the case for a multivariate model and your answers to question 1.

3. Write a description of the findings in table 14B, using the GEE approach to summarize findings across the six dependent variables, following the guidelines on pages 346–47 of *Writing about Multivariate Analysis*.

Table 14B. Results from OLS models of six neighborhood characteristics and housing quality measures, Yonkers Residential Mobility Program, 1994–1995

	Dependent variable					
Independent variable	Danger	Victimization	Disorder	Cohesion	Resources	Housing quality[a]
Mover	–0.99***	–0.19**	–1.25***	0.21***	0.13	–0.30***
Age (years)	0.01	0.00	0.00	0.00	0.00	0.00
Latino	0.16	0.00	–0.02	–0.01	0.09	–0.19***
High school graduate	0.06	0.07	0.04	0.02	0.05	–0.06
Female headed HH	–0.27*	–0.01	0.02	–0.03	–0.05	0.07
# children in HH	0.05	0.07*	0.05*	–0.01	0.00	0.03
R^2	0.34	0.05	0.73	0.14	0.02	0.20

Source: Adapted from Fauth, Leventhal, and Brooks-Gunn 2004, table 3.

[a] A higher value indicates worse housing quality (e.g., more problems with rats and mice).

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

4. Write a description of Zimmerman's findings (table 14C), focusing on the results for own SAT scores and roommate's SAT scores. Follow the guidelines in chapter 14 about organizing your description. Generalize across the three models to the extent possible: Which results are similar for the three groups and which differ? Why did Zimmerman run three models?

Table 14C. Estimated coefficients and standard errors from a model of cumulative grade point average by own SAT scores and roommate's SAT scores, Williams College classes of 1999–2001

	Student's own combined math & verbal SAT score		
	Lowest 15%	Middle 70%	Top 15%
Own verbal SAT score/100	0.205	0.199	0.118
	(0.039)	(0.015)	(0.055)
Own math SAT score/100	0.065	0.112	0.045
	(0.036)	(0.017)	(0.051)
Race (ref. = white)			
Black	–0.181	–0.386	–0.800
	(0.046)	(0.053)	(0.059)
Hispanic	–0.036	–0.254	–0.050
	(0.059)	(0.046)	(0.274)
Native American	–0.238	0.212	dropped
	(0.169)	(0.168)	
Not a U.S. citizen	0.076	0.126	0.055
	(0.091)	(0.055)	(0.066)
Asian	0.210	–0.065	–0.201
	(0.120)	(0.026)	(0.047)
Female	0.262	0.103	0.107
	(0.038)	(0.016)	(0.028)
Roommate's verbal SAT score/100	0.006	0.043	–0.013
	(0.025)	(0.012)	(0.021)
Roommate's math SAT score/100	–0.038	–0.021	0.030
	(0.028)	(0.012)	(0.022)
Sample size	450	2,072	629
R^2	0.41	0.27	0.21

Source: Adapted from David A. Zimmerman, "Peer Effects in Academic Outcomes: Evidence from a Natural Experiment," *Review of Economics and Statistics* 85.1 (2003): 9–23, table 4.

Answer questions 5 through 7 based on the results in table 14D from Fussell and Massey (2004).

Table 14D. Estimated log-odds of first trip to the United States, Men, 1987–1998 Mexican Migration Project

	Log-odds	Standard error
Demographic background		
Age (years)	–0.003	0.02
Age-squared	–0.001	0.0002
Ever married	–0.09	0.06
Number of minor children in household	0.01	0.01
Human capital		
Years of education	–0.04	0.006
Months of labor-force experience	–0.002	0.0007
Social capital in the family		
Parent a prior U.S. migrant	0.51	0.05
Siblings prior U.S. migrants	0.36	0.02
Social capital in the community		
Migration prevalence ratio[a]		
0–4	–0.99	0.15
5–9	–0.09	0.12
(10–14)		
15–19	0.35	0.10
20–29	0.57	0.13
30–39	0.95	0.15
40–59	0.74	0.19
60 or more	0.34	0.15
Intercept	–3.31	0.26
– 2 log likelihood	23,369.2	
Df	26	

Source: Adapted from Elizabeth Fussell and Douglas S. Massey, "The Limits to Cumulative Causation: International Migration from Mexican Urban Areas," *Demography* 41.1 (2004): 151–71. Table 2, http://muse.jhu.edu/journals/demography/v041/41.1fussell.pdf.

Note: Model also includes controls for occupational sector, internal migratory experience, community characteristics, and Mexican economic and U.S. policy context.

[a] The migration prevalence ratio = the number of people aged 15+ years who had ever been to the U.S./the number of people aged 15+ years ×100.

5. Write a description of the age pattern of migration to the United States, with reference to the chart you created in question 7a of the problem set to chapter 6.

6. Write a description of the relationship between human capital and migration.

7. Write one to two paragraphs describing the association between social capital in the family and community and migration from Mexico to the United States, with reference to the chart you created in question 7b of the problem set to chapter 6.