Chapter 5

39. Gasoline sales A service station near an interstate highway sells three grades of gasoline: regular, plus, and premium. During the last week, the manager counted the number of cars that purchased these types of gasoline. He kept the counts separate for weekdays and the weekend. The data table has two categorical variables. One distinguishes weekdays from weekends, and the other indicates the type of gas (regular, plus, or premium).

- (a) Find the contingency table defined by the day of the week and the type of gas. Include the marginal distributions.
- (b) Find the conditional distribution of purchase type for weekday purchases.
- (c) Find the conditional distribution of premium purchases during the week and weekend.
- (d) Does the fact that your answers to parts (b) and (c) are different indicate association?
- (e) The owner of the station would like to develop better ties to customers who buy premium gas. (The owner expects these customers to be more affluent and likely to purchase other services from the station.) If the owner wants to meet more of these customers, when should the owner be around the station: on weekdays or weekends?

41. The contingency table in Exercise 39 shows counts of the types of gasoline bought during the week and during weekends.

- (a) Find the value of chi-squared and Cramer's *V* for this table.
- (b) Interpret these values. What do these tell you about the association in the table?

53. Time Arrival These data compare the on-time arrival performance of United and US Airways. The table shows the status of 13,511 arrivals during January 2006.

Status	United	US Airways
On time	6,291	4,366
Delayed	1,466	1,388

- (a) On the basis of this initial summary, find the percentages (row or column) that are appropriate for comparing the on-time arrival rates of the two airlines. Which arrives on time more often?
- (b) The next two tables organize these same flights by destination. The first also shows arrival time and the second shows airline. Does it appear that a lurking variable might be at work here? How can you tell?

Status	Dallas	Denver	Minneapolis	Philadelphia
On time	829	5,661	518	3,649
Delayed	205	1,205	160	1,284

Airline	Dallas	Denver	Minneapolis	Philadelphia
United	450	6,323	474	510
US Airways	584	543	204	4,423

- (c) Each cell of the following table shows the number of on-time arrivals for each airline at each destination. Is *Destination* a lurking factor behind the original 2×2 table?

Airline	Dallas	Denver	Minneapolis	Philadelphia
United	359	5,208	360	364
US Airways	470	453	158	3,285