

2.4. Crosstabulations and scatter diagrams:

The crosstabulation (table) and the scatter diagram (graph) can help us understand the relationship between two variables.

1. Crosstabulations

Example 1:

Objective: Explore the association of the quality and the price for the restaurants in the Los Angeles area.

The following table is the crosstabulation of the quality rating (good, very good and excellent) and the mean price (\$10 – 19, \$20 – 29, \$30 – 39, and \$40 – 49) data collected for a sample 300 restaurants located in the Los Angeles area.

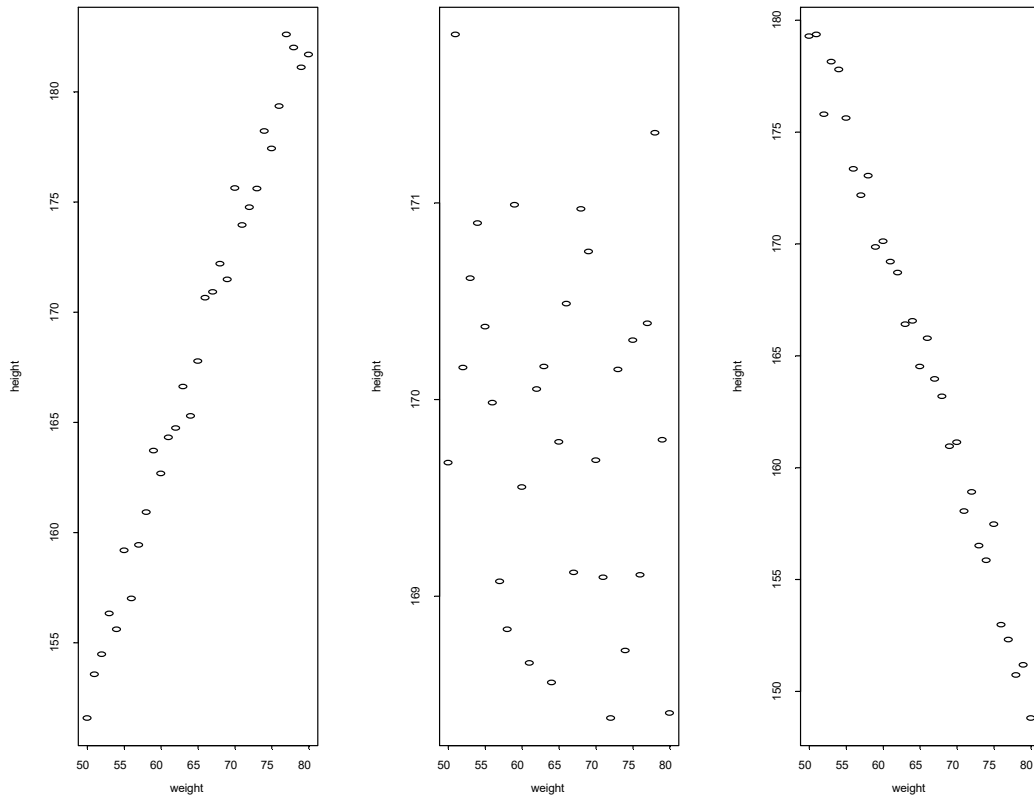
Meal Price					
Quality Rating	\$10 – 19	\$20 – 29	\$30 – 39	\$40 – 49	Total
Good	42	40	2	0	84
Very Good	34	64	46	6	150
Excellent	2	14	28	22	66
Total	78	118	76	28	300

The above cross-tabulation provides insight about the relationship between the variables, quality rating and mean price. It seems higher meal prices appear to be associated with the higher quality restaurants and the lower meal prices appear to be associated with the lower quality restaurants. For example, for the most expensive restaurants (\$40 – 49), none of these restaurants is rated the lowest quality but most of them are rated highest quality. On the other hand, for the least expensive restaurants (\$10 – 19), only 2 of these restaurants are rated the highest quality ($\frac{2}{78} = 2.56\%$) but over half of them are rated lowest quality.

2. Scatter diagram

Suppose we have the following scatter diagrams for the weights and heights of the students:

Scatter Diagram of Weight v.s. Height



The **left** scatter diagram indicates the **positive relationship** between weight and height while the **right** scatter diagram implies the **negative relationship** between the two variables. The **middle** scatter diagram shows that there is **no apparent relationship** between the weight and height.