

### 1. Problem

In a small city the satisfaction with the local public transportation is evaluated. One question of interest is whether inhabitants of the city are more satisfied with public transportation compared to those living in the suburbs.

A survey with 250 respondents gave the following contingency table:

Evaluation	Location	
	City	Suburbs
Very good	19	11
Good	45	31
Bad	25	66
Very bad	11	42

The following table of percentages was constructed:

Evaluation	Location	
	City	Suburbs
Very good	19.0	7.3
Good	45.0	20.7
Bad	25.0	44.0
Very bad	11.0	28.0

Which of the following statements are correct?

- (a) The value in row 3 and column 2 in the percentage table indicates: 44 percent of the respondents in the suburbs evaluated the public transportation as bad.
- (b) The percentage table provides row percentages.
- (c) The percentage table can be easily constructed from the original contingency table: Each value is in relation to the total sample size.
- (d) The value in row 4 and column 2 in the percentage table indicates: 28 percent of those, who evaluated the public transportation as very bad, live in the suburbs.
- (e) The percentage table provides the satisfaction distribution for each location type.

### Solution

In the percentage table, the column sums are about 100 (except for possible rounding errors). Hence, the table provides column percentages, i.e., conditional relative frequencies for satisfaction level given location type.

- (a) True. This is the correct interpretation for column percentages.
- (b) False. The row sums are not equal to 100.
- (c) False. This calculation yields total percentages. But the table provides column percentages.
- (d) False. This is an interpretation for row percentages, but the table provides column percentages.
- (e) True. The column sums are equal to 100 (except for possible rounding errors).