

Speed Trap

Task

A statistically-minded state trooper wondered if the speed distributions are similar for cars traveling northbound and for cars traveling southbound on an isolated stretch of interstate highway. He uses a radar gun to measure the speed of all northbound cars and all southbound cars passing a particular location during a fifteen minute period. Here are his results:

Northbound Cars				
60	62	62	63	63
63	64	64	64	65
65	65	65	66	66
67	68	70	83	
Southbound Cars				
55	56	57	57	58
60	61	61	62	63
64	65	65	67	67
68	68	68	68	71

Draw box plots of these two data sets, and then use the plots and appropriate numerical summaries of the data to write a few sentences comparing the speeds of northbound cars and southbound cars at this location during the fifteen minute time period.

Commentary

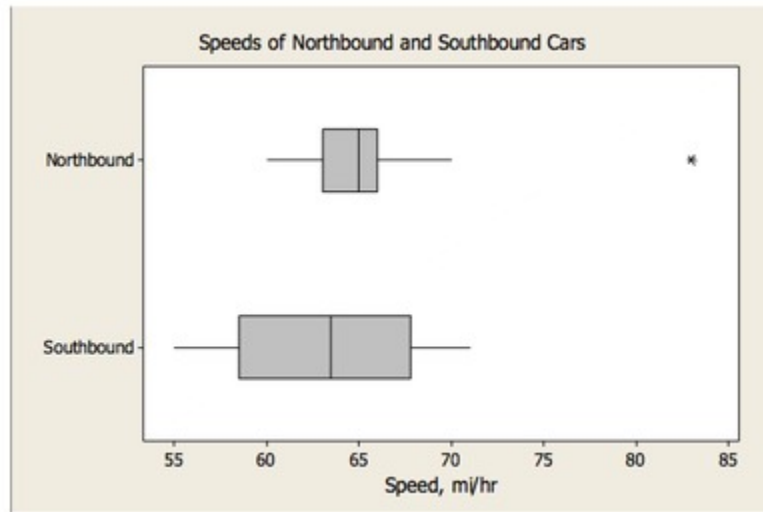
The purpose of this task is to allow students to demonstrate an ability to construct boxplots and to use boxplots as the basis for comparing distributions. The solution should directly compare the center, spread, and shape of the two distributions and comment on the high outlier in the northbound data set.

Students often fail to include context when comparing distributions. Encourage students to be sure to provide the comparison in context. For example, in this task the comparison should be in terms of car speeds of northbound cars and southbound cars.

Also encourage students to actually *compare* northbound and southbound speed distributions, and not just describe each distribution separately.



Solution



Using the median to describe typical speed, we would say that typical speed is about the same (median of 65 mph for northbound and 63.5 mph for southbound) for northbound cars and southbound cars. One noticeable difference between the two speed distributions is that the southbound speeds are more variable than the northbound speeds. This means that the northbound speeds tended to be more consistent than the southbound speeds, which tended to differ more from one car to another. Other than the outlier in the northbound speeds, both speed distributions appear to be approximately symmetric.