

A Probability Assessment of Falls During an Olympic Vaulting Competition

During the 2000 Olympics in Australia, five women gymnasts fell or sat down after jumping over the horse in their vaulting routine. This was a very high proportion of those entering the competition. Common sense suggests that it is very unlikely to have that many highly skilled gymnasts falter at this exercise. Suppose the probability that one particular Olympic gymnast will sit down or fall at the conclusion of the vault is .1. The actual probability should be much lower. What is the probability that the first five will fall.

If the outcomes for different gymnasts are assumed to be independent, we use the product rule to calculate the probability that all five gymnasts fall or sit down. This probability is $.1 \times .1 \times .1 \times .1 \times .1 = .00001$

and this is a very small probability. Consequently, we suspect the environment for the competition is unusual. As it turned out, the horse was set 2 inches lower than the standard height. This was remedied and they restarted the competition. However, it must have been very unnerving to the participants who had initially taken hard falls.

Exercise

If only 3 out of 5 fell, would you reach a different conclusion?

What if only 2 out of 5 fell what would you conclude?