Questions Module 3.3

In the box beside each term, enter the letter of the appropriate definition.

☐ stability	a. having low measurement error for different operators measuring the same parts
☐ reproducibility	b. having low measurement error associated with multiple measurements taken under identical conditions
☐ repeatability	c. having the same mean and standard deviation when taking measurements on the same part over time
☐ bias	d. on average, the measurement system overstates or understates the true value

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Incorrect.
The correct answers from top to bottom are **c**, **a**, **b**, **d**.

In a crossed MSA, all inspectors measure all parts (with all gauges used in the study). Is the following statement true or false?

The presentation of the parts to the operators should be randomized.

- ○ a. True
- ○ b. False

Incorrect.
The correct answer is **a**, True. Parts should be presented in random order to reduce time-related differences and to prevent the operator from remembering the previous measurement.

In the micrometer example, there appears to be an interaction between the part and the inspector for the first five parts. This means that, for the same parts, the different operators aren't getting the same measurements.

What are some reasons why there might be an interaction between operators and parts?

Potential Answers

Within this MSA:

- The inspectors might orient the parts differently within the micrometer.
- They might use or handle the micrometer differently.
- They might round up or down differently.
- There might also be specific features in the particular parts that cause inspectors to produce different measurements.

In general, interactions can be caused by batches or parts not being prepared the same way by the different operators, different operators might set up the equipment differently, or other there might be other differences in measurement procedures.

In the previous video, we learned that the average bias is -0.37. What does this mean?

- a. There is a lot of repeatability variation.
- b. On average, the measurements are larger than the true value.
- c. All of the measurements are larger than the true value.
- d. On average, the measurements are below the true value.
- e. All of the measurements are below the true value.

Incorrect.
The correct answer is **d**. On average, the measurements are below the true value.