Replication (and Replicability) versus Reproduction (and Reproducibility)

Some scientists use the term *replication* (and *replicability*) as synonyms of *reproduction* (and *reproducibility*).

For example, Shuttleworth (2009) writes that “Reproducibility is regarded as one of the foundations of the entire scientific method, a benchmark upon which the reliability of an experiment can be tested. The basic principle is that, for any research program, an independent researcher should be able to replicate the experiment, under the same conditions, and achieve the same results.”

However, some scientists distinguish between *replication* (and *replicability*) versus *reproduction* (and *reproducibility*).

For example, Peng (2011) defines “replication as [a group of independent] researchers going out and collecting new data” in an attempt to replicate a study previously conducted by another group of researchers. In contrast, Peng defines “reproducibility as [a group of independent] researchers analyzing the [previously collected] data” of a study previously conducted by another group of researchers.

So, according to Peng (2011), with replication, an independent group of researchers conduct a replication of a previously conducted study, including collecting and analyzing their own data, to see if they get the same results; with reproduction, an independent group of researchers analyze the data from a previously conducted study to see if they get the same results.

In addition, Shuttleworth (2009) distinguishes between reproducibility and repeatability, which is when “the (same) researchers repeat their (own) experiment to test and verify their results.”

For this course you may use the terms interchangeably; however, be aware that some scientists do make a distinction among the terms.