

Statistical Studies: Statistical Investigations

III.A Student Activity Sheet 1: Overview of Purpose, Design, and Studies

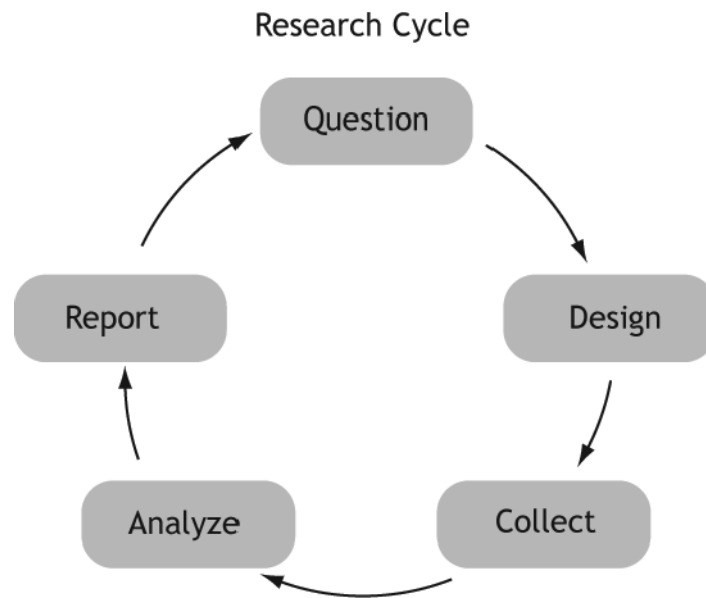
Music is a large part of many people's lives. Because of this, it is often the subject of study. For example,

- Music industry executives want to know what will be popular with different age groups.
- Advertisers want to know which radio stations are the most popular.
- Doctors want to know how much hearing damage results from loud music.
- Teachers want to know whether or not listening to classical music helps students perform better on tests.



Statistical investigations are used every day for a variety of reasons.

1. What are the purposes of statistical investigations? Give some examples of statistical investigations with which you are familiar.



This graphic illustrates the process of planning and implementing a statistical investigation. First, a question (or a series of questions) sparks the interest of a researcher. The research team then decides on the best design for investigating the question.

2. The graph shows no obvious ending point (or starting point). What does this mean?

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Consider the following examples of two different types of statistical investigations.

Example 1

Radio rating services sometimes collect data on listenership by asking participants to record the date, time, and station each time they listen to the radio. Other rating services distribute monitoring devices that automatically record this information anytime the participant has the radio turned on. Still others call participants and ask them about their listening habits. The data are then compiled so that advertisers know which stations are the most popular at specific times during the day.

Each of these approaches is an example of an **observational study**, which collects data about some characteristic(s) of the population. The data can be collected by observation, by a survey or interview, or by other means.

3. Describe an observational study in your own words:

An observational study is research in which

Example 2

*A 17-year-old student designed a science fair project with 72 mice randomly assigned to three groups: hard rock music, Mozart, and no music at all (called a **control group**). The mice in the first two groups were exposed to music 10 hours a day. Three times a week, all of the groups were timed as they ran through a maze. An analysis of results showed that the 24 mice in the no-music group averaged about a 5-minute improvement in their maze completion time, while the Mozart mice improved 8.5 minutes. The hard rock mice actually got slower—an average of four times slower! Another interesting fact: The student had to start his experiment over because all the hard-rock mice killed each other. None of the classical mice did that. (Wertz, M. [1998]. *Why classical music is key to education*. from www.schillerinstitute.org/programs/program_symp_2_7_98_tchor_.html#Music_Mice_Mazes)*

This is an example of an **experimental study**. In an experimental study, the researcher separates the participants into one or more groups and applies some sort of treatment. After treatment, the variable of interest is measured and the results are compared.

4. What are the **treatment** and the **variable of interest** in this case?

5. Describe an experimental study in your own words:

An experimental study is research in which