

13.1: Prelude to F Distribution and One-Way ANOVA

CHAPTER OBJECTIVES

By the end of this chapter, the student should be able to:

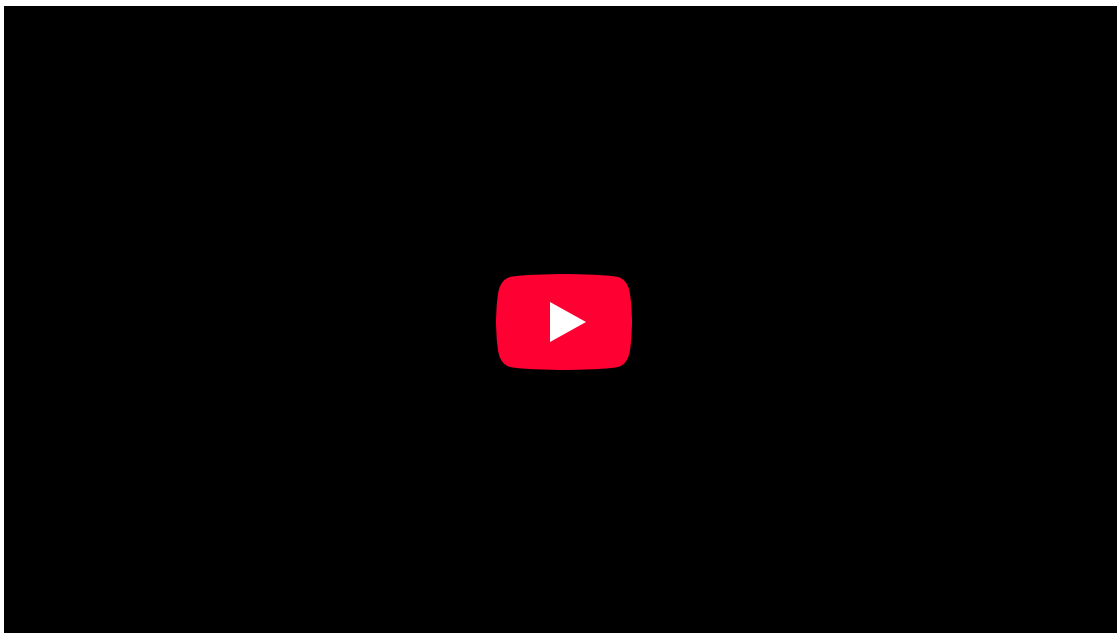
- Interpret the F probability distribution as the number of groups and the sample size change.
- Discuss two uses for the F distribution: one-way $ANOVA$ and the test of two variances.
- Conduct and interpret one-way $ANOVA$.
- Conduct and interpret hypothesis tests of two variances

Many statistical applications in psychology, social science, business administration, and the natural sciences involve several groups. For example, an environmentalist is interested in knowing if the average amount of pollution varies in several bodies of water. A sociologist is interested in knowing if the amount of income a person earns varies according to his or her upbringing. A consumer looking for a new car might compare the average gas mileage of several models.



Figure 13.1.1. One-way ANOVA is used to measure information from several groups.

For hypothesis tests comparing averages between more than two groups, statisticians have developed a method called "Analysis of Variance" (abbreviated $ANOVA$). In this chapter, you will study the simplest form of $ANOVA$ called single factor or one-way $ANOVA$. You will also study the F distribution, used for one-way $ANOVA$, and the test of two variances. This is just a very brief overview of one-way $ANOVA$. You will study this topic in much greater detail in future statistics courses. One-Way $ANOVA$, as it is presented here, relies heavily on a calculator or computer.



All Roads the Same?

**SPEED
LIMIT
50**

Are the mean driving speeds the same for Highway 50, Highway 89, and Pioneer Trail?

Hwy 50	58	52	51	47	49	60	56
Hwy 89	43	47	56	49	42	47	58
Pioneer Tr.	51	55	50	56	54	55	50

6

Contributors

Barbara Illowsky and Susan Dean (De Anza College) with many other contributing authors. Content produced by OpenStax College is licensed under a Creative Commons Attribution License 4.0 license. Download for free at <http://cnx.org/contents/30189442-699...b91b9de@18.114>.

This page titled [13.1: Prelude to F Distribution and One-Way ANOVA](#) is shared under a [CC BY 4.0](#) license and was authored, remixed, and/or curated by [OpenStax](#) via [source content](#) that was edited to the style and standards of the LibreTexts platform.