

Setting up Nonparametric Tests

Author: Dr. Romi L. Burks, Southwestern University
burksr@southwestern.edu

Course Information

Department: Methods in Ecology and Evolution; Ecology

Level: **Sophomore and Upper Undergraduate**

Course type: **Lab**

Students: **Majors**

Number of Students: **16**

Focus: Fill in this line with the focal problem that the lesson addresses, identified in step 1, question 1 in your initial lesson design.

Overview: This swirl lesson will show you how to rearrange your data within R from one that shows a multiple factor design to a single factor to allow for data analyses that require nonparametric statistics. I anticipate that this skill will be useful when it comes to analyzing data from class projects. A lot of ecological data often violates assumptions of normality and thus cannot be successfully transformed and requires nonparametric approaches. The swirl lesson I create will build off of the existing swirl lesson “Manipulating_Data_with_dplyr” within the “Getting_and_Cleaning_Data” swirl course. By completing a whole swirl course first, all students will learn about the basic functions in R and how to work within R_Studio. At the end of the two data manipulation lessons (existing and modified), you will have gained the skills necessary to arrange your future data in the right form for easy analysis in R. In addition, you will reinforce your understanding of the process associated with proper statistical analysis.

Learning objectives: List the learning objectives that you identified in step 5 of your initial lesson design, with any modifications.

- 1 - Expose students to R, R Studio and Swirl
- 2 - Facilitate student agency in learning statistics
- 3 - Increase student recognition of when nonparametric tests are necessary
- 4 - Bolster student level of confidence in quantitative work

Lesson sequence: Provide a numbered, ordered list of the activities within your swirl lesson. This list can be taken from step 4 in your initial lesson design, with any modifications that were introduced.

1. Examine the data structure
2. Identify the dependent variable
3. Test variable for normality
4. Try and transform variable
5. Re-test for normality
6. Unite column to change data format
7. Conduct general non-parametric tests
8. Follow-up with post-hoc tests
9. Interpret statistics
10. Write results

Pre-lesson activities: Briefly describe any activities that you did to prepare your class for the swirl lesson. If none, delete this section.

Students did Swirl modules 1-5 of Data Analysis.

Post-lesson activities: Briefly describe any activities, including assessments, that you completed after the swirl lesson to support or assess learning objectives. If none, delete this section.

Ask for students to write a result section based on their output.

Implementation notes: Please add any useful information that you learned through your lesson development and implementation that may be helpful to other teachers who would like to implement this lesson.

Having them do other swirl modules before this one helped

Teaching them to take notes as they do the swirl module also helped

This one is probably a little long/ambitious