

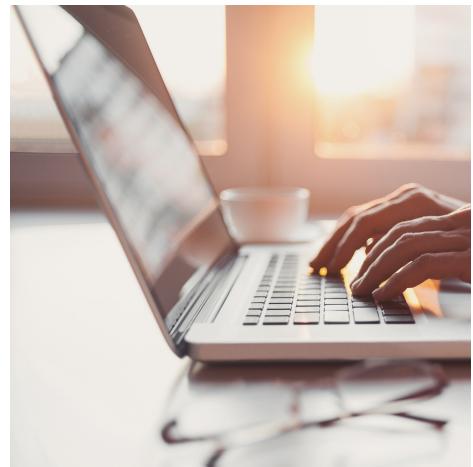
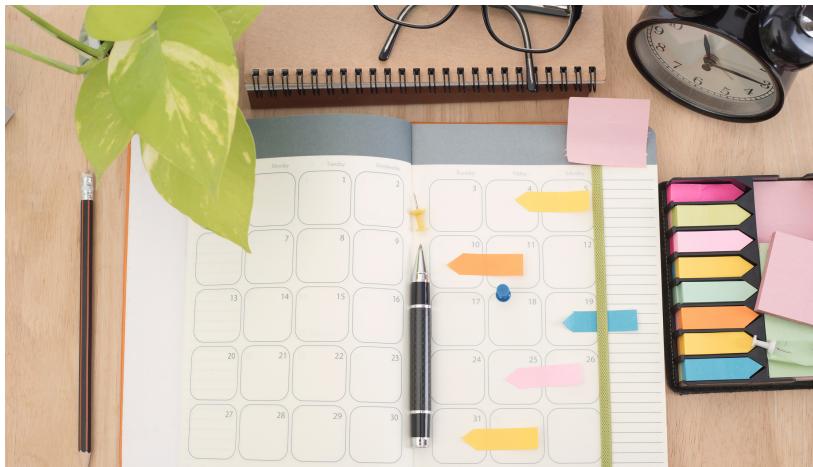
# Newsletter

## A "WORDY" RESOURCE

by Donna LaLonde

"The writing style in this book may be described as 'wordy.'" This is a quote from the "About this Book" section of the book Probability! (<https://bookdown.org/probability/beta/>), written by Matt DosSantos DiSorbo. The book is labeled as an "interactive introduction" and was developed from the author's master's thesis. The author describes the book as a "companion" to the Stats 110 (<https://projects.iq.harvard.edu/stat110>) course taught by Joe Blitzstein at Harvard University. The overarching philosophy of this book is that a novice learner benefits from more explanation thus the "wordy" description.

*....continued on page 2*



## UPCOMING ACTIVITIES

Be sure to check out our upcoming fall webinars and conference plans on page 7.



The book is dedicated to the readers because the author considers the text to be in a “dynamic editing” stage and welcomes input from readers. The current text has an Introduction to R as chapter 0 with ten additional chapters. Topics considered are: counting, conditional probability, discrete random variables, continuous random variables, moment generating functions, joint distributions, covariance and correlation, Beta and Gamma, limit theorems and conditional expectations, and Markov chains. The chapters are a combination of explanatory text complemented by R code snippets to illustrate the concepts. Each chapter concludes with a practice section with problems to reinforce the concepts covered in the chapter. The book is also supported by a YouTube channel - <https://www.youtube.com/channel/UCBsXfUOnzMnlaLLUx7DFQ/featured>

From his profile, it seems the author has recently begun a doctoral program in data science so may not be spending much time revising this book. However, the existing text is a nice resource to complement your existing resources. The author is also a contributor to the Skew the Script (<https://skewthescript.org/>) project. Skew the script provides curricula through the lens of relevant societal issues. One of the content areas is AP Statistics, so you may want to check out this project too.



**Join the StatPREP Community**

- Type [connect.maa.org](https://connect.maa.org) into your browser to get started
- Create an account
- Find and join the StatPREP Community

» [Getting Started Video](#)

» [Getting Started Guide](#)

» [StatPREP Connect Webinar](#)

# COMPARING TWO GROUPS LITTLE APP ACTIVITY

by Kathryn Kozak

The Little App activity called [Comparing Two Groups](#) is useful when introducing hypothesis testing and the idea of sample variability.

This activity starts off with an orientation to a scenario that motivates the need for a hypothesis test. This particular scenario looks at a question about social-economic factors.

## Orientation

A friend and I were discussing ways to measure poverty. Of course, there's the so-called "poverty level" of income defined by the US government. But we were interested in whether it might be worthwhile to do a detailed interview with, say, 100 families, quantifying how much trouble they have paying for different things: food, housing, healthcare, transportation, emergencies, etc. Then we'd look at easy things to measure so that we could have an index for these different things, food stress, housing stress, and so on.

To get started, we decided to look at some already available data to generate ideas about what things might be related to poverty. This could help us design our interview.

We know that you're taking a statistics course, so we arranged to visit with you so that you could help us handle the data. You told us that you already have some data about income, health, socio-economic factors and such. It's called the NHANES data.

We arranged to meet you in a local coffee shop, which has free internet.

## National Health and Nutrition Evaluation Survey data

### Description

National Health and Nutrition Evaluation Survey data

### Usage

```
data(NHANES2)
```

### Format

The variables are

- `sex` : Sex of study participant coded as male or female
- `age` : Age in years at screening of study participant. Note: Subjects 80 years or older were recorded as 80.
- `marital` : Marital status of study participant. Reported for participants aged 20 years or older. One of Married, Widowed, Divorced, Separated, NeverMarried, or LivePartner (living with partner).
- `ever_married` : Was the participant ever married
- `race` : Reported race of study participant: Mexican, Hispanic, White, Black, or Other.
- `education` : Educational level of study participant Reported for participants aged 20 years or older. One of 8thGrade, 9-11thGrade, HighSchool, SomeCollege, or CollegeGrad.
- `income` : Total annual gross income for the household in US dollars. The levels are categorical: the number refers to the middle income in a category.
- `income_poverty` : The ratio of income in dollars to the poverty level of income
- `home_rooms` : How many rooms are in home of study participant (counting kitchen but not bathroom). 13 rooms = 13 or more rooms.

There are more variables in the NHANES dataset, so make sure the students arrow down to see all the variables. The activity then goes on to ask the students to change the explanatory variable to `home_type` and to show the means on the plots, allowing the students to see the difference between the means.

The activity then goes on to have the students interact with the Confidence and T Little App, and tells the students what dataset and variables to use.

....continued on page 4

The graph produced raises some questions about what the variable is actually measuring, so then the students are asked to access the codebook. This gives the source of the data and also describes each of the variables. Every data set in a Little App has a codebook, so it is good to get your students into the habit of checking there to fully understand what the variables are measuring. The codebook is accessed using the icon that looks like an eye.

This activity then instructs the students to take repeated samples from the data and see how the means change. One important question asked is if the mean for the own variable is always greater than the mean for the rent variable. The students can visually see the sampling variability.

I really like this activity because it reinforces so many core principles in the StatPREP paradigm. Students have a story that naturally leads to important statistical questions, they learn more about what variables represent, and then can visually see the variability of samples. They also get an intuitive idea of testing a hypothesis. In addition, an introduction to randomization at the end of the activity allows students to experience a more modern method of hypothesis testing that is very useful when one does not know the underlying distribution of the means.

This is a great activity for introducing hypothesis testing. There are other activities. Please visit the statprep.org website. Click on Little Apps and then on Little App Activities to see more.

## Little Apps for Teaching Stats

Instructions, activities, and information about the StatPREP Little Apps.

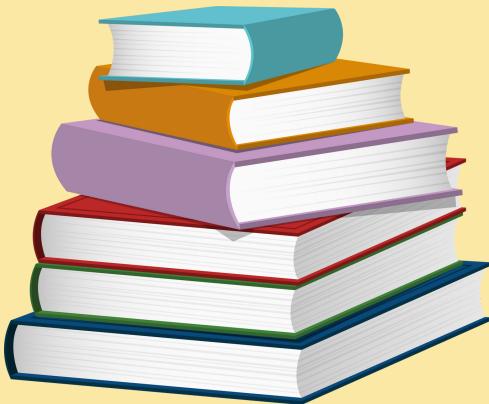
# SHOUT OUT FOR FREE!



Ambika Silva

We on the StatPREP team love free resources, which is why we try to make our resources free and easy to access! Whether you teach online or in person, these resources may help engage your learners.

For students already struggling to afford rising tuition and housing costs, any additional expenses to a course can be a hurdle to accessing higher education.



In a study conducted by Florida Virtual Campus in 2012, 65% of respondents indicated that they did not purchase textbooks at one point in their schooling due to cost. This same survey also indicated that 35% of students reduced their semesterly course load due to textbook cost and that 23% of students regularly forego purchasing textbooks due to cost alone

(<https://openoregon.org/wp-content/uploads/2015/06/The-direct-relationship-between.pdf>)

Lower costs will result in students being less dependent on student loans and may even result in higher program completion rates. We can help our students with our textbook choices and utilizing free resources

During our 2021 summer virtual workshops, we asked participants to give a shoutout for some resources other than StatPREP. We've included the list on MAA connect (<https://connect.maa.org/home>).

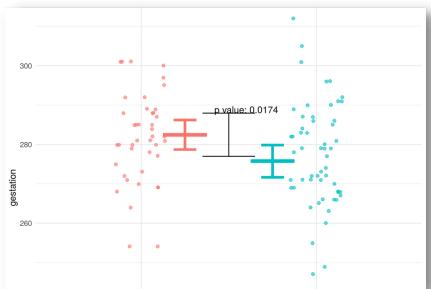
Join or login to MAA Connect to see the list and we'd love to hear what you've used off the list and how it worked for you. Feel free to add more to the list if you have a free resource that you find helpful in your Introductory Statistics courses!



**MAA** CONNECT

# Upcoming Webinars

## AN INTRODUCTION TO CONFIDENCE INTERVALS: AN INTERACTIVE WEBINAR



Presented by Rona Axelrod



Thursday, October 21  
2:00pm ET

The StatPREP Little Apps are a collection of free, easy-to-use online tools that help students visualize the statistical concepts using real-world data. We will explore the StatPREP Little App for Confidence Intervals. In this interactive session, we will visualize the characteristics of a confidence interval, demonstrate what a confidence level is, re-sample data, and create side-by-side comparisons. These visualizations can be used to introduce the topic as well as in classroom assessments.

[REGISTER](#)

## INTRODUCTION TO RSTUDIO AND EXPLORATORY DATA ANALYSIS

Presented by Joe Roith & Kathryn Kozak



Monday, November 8  
4:00pm ET



This workshop will introduce participants to RStudio using RStudio Cloud. In addition RStudio server and RStudio desktop will be described. This introduction will include packages and reading data into RStudio. Then there will be an introduction to Exploratory Data Analysis (EDA).

[REGISTER](#)



# Save the Date

## AMATYC CONFERENCE 2021



**Session: S091, Title: Utilize StatPREP's Free Little Apps to Teach Data-Centric Statistics**

**Day: Saturday, October 30**

**Time: 10:45 am - 11:35 am**

**Room: Deer Valley**

**Presenters: Helen Burn, Carol Howald, Rona Axelrod & Joe Roith**

Learn about free, online tools from StatPREP that can help you and your students learn fundamental concepts in introductory statistics. StatPREP is an NSF-supported faculty development project sponsored by the Mathematical Association of America (NSF DUE-1626337). Faculty leaders from five national StatPREP hubs will share their use of the menu-and-slider Applets made with R markup language.

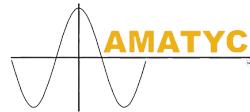
**LEARN MORE**

## STATPREP SUMMER 2022 WORKSHOP



In-Person Workshop in Fort Myers, Florida, will be held on May 20-21, 2022.

Details on how to register will be coming!



#### LEADERSHIP TEAM

Mike Brilleslyper, Florida Polytechnic University

Jenna Carpenter, Campbell University

Danny Kaplan, Macalester College

Kathryn Kozak, Coconino Community College

Donna LaLonde, ASA

Ambika Silva, College of the Canyons

Deirdre Longacher Smeltzer, MAA

#### HUB LEADERS

Joe Roith, St. Olaf's College, Northfield, MN (2017-18)

Ambika Silva, College of the Canyons, Santa Clarita, CA (2017-18)

Helen Burn, Highline College, Seattle, WA (2018-19)

Hwayeon Ryu, Elon University, Elon, NC (2018-19)

Carol Howald, Howard Community College, Columbia, MD (2019-2020)

Thomas Kinzeler, Tarrant County College, Fort Worth, TX (2019-2020)

Rona Axelrod, Florida SW State College, Fort Myers, FL (2020-2021)