

August  
21, 2020

# StatPREP



# MAA

MATHEMATICAL ASSOCIATION OF AMERICA

## NEWSLETTER

### BUILDING COMMUNITY THROUGH DISCUSSION BOARDS: ADVIL PM (EXPERIMENTAL DESIGN, OBSERVATIONAL STUDY, PLACEBOS)

BY AMBIKA SILVA

Creating community in a distance education course is vital. A discussion board engages statistics students to have virtual conversations, which allowed them to build on one another's statistical thinking (Theoret & Luna, 2009). One topic that is appropriate when discussing EDA (Exploratory Data Analysis) or boxplots, is an Abreva commercial found online: <https://www.youtube.com/watch?v=ZxTrDo8fMyA>. The link may vary, but searching for "Advil PM dance commercial" usually will find it if this link does not work. In it, you will find part of the commercial with the following or a similar statement.

The commercial states that you can "Stay asleep longer [with Advil PM]. Compared to placebo or no treatment." You can either :



1. Give the commercial link and make them search for the hidden message!!
2. OR, give the screenshot and make them focus on that.

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#### WHO'S WHO:

##### LEADERSHIP TEAM

Mike Brilleslyper,  
Air Force Academy

Jenna Carpenter,  
Campbell University

Danny Kaplan,  
Macalester College

Kathryn Kozak  
Coconino Community  
College

Donna LaLonde,  
ASA

Ambika Silva  
College of the Canyons

Rachel Levy  
MAA

##### HUB LEADERS

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

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

Helen Burn, Highline Col-  
lege, Seattle, WA (2018-19)

Hwayeon Ryu, Elon Univer-  
sity, Elon, NC (2018-19)

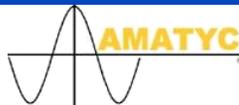
Carol Howald, Howard Com-  
munity College, Columbia,  
MD (2019-2020)

Thomas Kinzeler, Tarrant  
County College, Fort Worth,  
TX (2019-2010)

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

Brooke Orosz, Essex Coun-  
ty College, Newark, NJ  
(2020-2021)

Support for this MAA Program is provided by NSF DUE-1626337



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# BUILDING COMMUNITY Continued...

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## Sample Prompt and Student Responses

- What is hidden in the commercial, why did I put this in the discussion?
- What is the commercial stating about its effectiveness?
- What could Advil PM have done to make a stronger case for their brand?
- Did they do an experiment or observational study do you think and why?

Student sample responses can vary wildly, and a few are given here to demonstrate the type of first responses students may give:

### Student #1 Initial Post

*(verbatim, so typos/spelling errors that student made are included):*

The commercial is stating that this pill is going to make someone fall asleep faster. On the surface level that's what it looks like this pill will do. This is before you notice the fine print on the bottom of the advertisement. On the bottom fine print it states that the treatment is compared to a placebo or no treatment. Reading the fine print on the Ads is very important because with this information, we can realise the pill is not effective as we once thought. I find that the truth isd always revealed in the fine print of an Ad. Advil Pm could have made a much stronger case for their brand by explaining how the pill works scientifically. In this case no one will know how the pill works or is even to lead the pill does anything because of the fine print on the bottom. I think this is an experiment, because they control a variable (in this case it's the Advil pill) and see if it has any effect on the sleeping habits of people. Since a variable was manipulated it leads me to believe that this information was gathered during an experiment.

### Student #2 Sample Response:

If you read the small print at the bottom it says it should be used for occasional sleeplessness associated with aches and pain. I feel like just looking at the big print where your eye is drawn by the yellow letters you would be misled that maybe it was more of a sleep aid and not be associated with aches and pain. The fact that it says it should be used for occasional aches and pain also makes it seem like you

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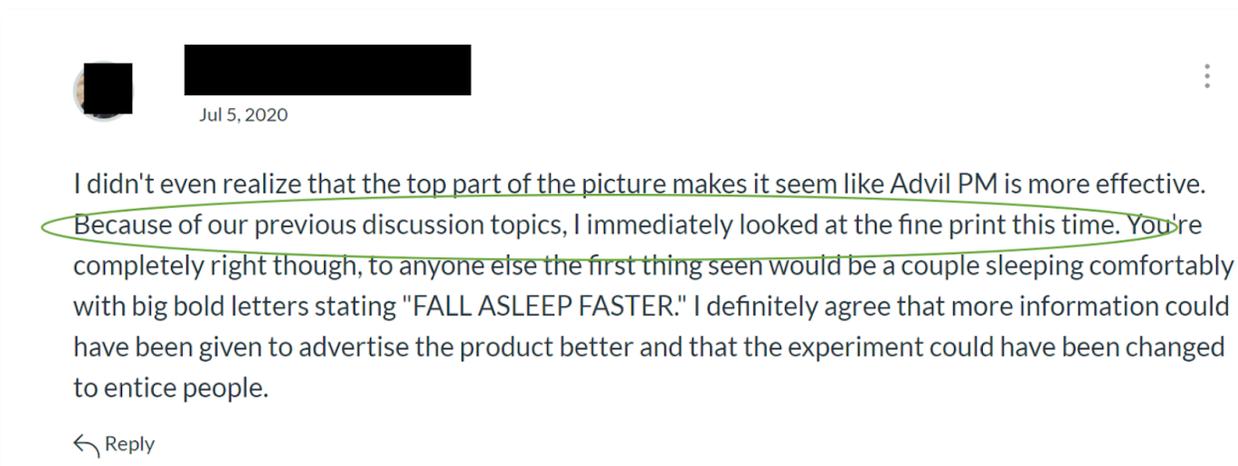
## BUILDING COMMUNITY Continued...

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*(continued)* shouldn't use it often. Advil PM could have worded its uses better by making them more apparent. For example they could have said that it dulls the aches and pain of a hard days work so that you can get to sleep faster instead of tossing and turning for hours due to discomfort. It also mentions that the product was compared to a placebo or no treatment, but doesn't give any statistics to compare the results. I think data to back up the fact that it actually does help you fall asleep faster would have helped to sell the commercial more. Advil PM should have also been tested against other products that are similar in order to make a stronger case for their brand. I believe that they did an experiment because they say that they compared results to a placebo, which means that there was a group who actually took the product. All in all I feel like if the picture provided more info and compared the studies using statistics it would have been an easier sell for Advil PM.

### Linking to Previous Discussion

Below is one of the replies that a student made to someone's initial post:



A screenshot of a social media-style reply. At the top left is a small black profile picture. To its right is a blacked-out name. Below the name is the date "Jul 5, 2020". On the far right is a vertical ellipsis menu icon. The main text of the reply is: "I didn't even realize that the top part of the picture makes it seem like Advil PM is more effective. Because of our previous discussion topics, I immediately looked at the fine print this time. You're completely right though, to anyone else the first thing seen would be a couple sleeping comfortably with big bold letters stating 'FALL ASLEEP FASTER.' I definitely agree that more information could have been given to advertise the product better and that the experiment could have been changed to entice people." The text "Because of our previous discussion topics, I immediately looked at the fine print this time." is circled in green. At the bottom left of the reply box is a "Reply" button with a left-pointing arrow.

What's beautiful about this reply is that they are remembering the Abreva commercial we already did!!! (See the last newsletter for information on that discussion topic!), even though these discussions are actually several weeks apart.

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## BUILDING COMMUNITY Continued...

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### Goals of this Discussion

In this discussion, I want students to make the conclusion that although they did not mention an experiment, that the mention of “placebo” suggests that an experiment was done. But because there’s no mention of anything done, we can’t assume random assignment was done. Moreover, the comparison to a placebo only tells us that the treatment was better than nothing, which may or may not be convincing.

### Join the Discussion!

Do you have thoughts on using this as a discussion post? Join the conversation online at MAA Connect, <https://connect.maa.org/home>.

**Want more StatPREP? Check out:**  
**<http://statprep.org/>**

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## ONLINE BUT WORKING TOGETHER!

BY DONNA LALONDE

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“Classroom environments in which students are provided opportunities to engage in mathematical investigation, communication, and group problem-solving, while also receiving feedback on their work from both experts and peers, have a positive effect on learning.” This is the introductory sentence from the 2016 Conference Board of the Mathematical Sciences (CBMS) on Active Learning in Post-Secondary Mathematics (and Statistics) Education (<https://www.cbmsweb.org/2016/07/active-learning-in-post-secondary-mathematics-education/>). Designing and implementing effective active learning activities is not easy but there are resources that can help.

In my classes, I used “board work” to get the students to collaborate and communicate. In a face-to-face classroom this would involve students finding a portion of the white-board available in the classroom and begin problem-solving. Of course, the proximity of another student encouraged communication and collaboration as

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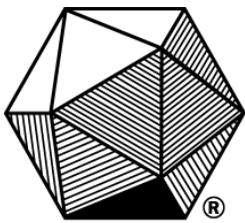
## ONLINE BUT WORKING TOGETHER! Continued...

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they worked on their problems. WHITEBOARD.fi (<https://whiteboard.fi/#home>) is a free online tool that allows a teacher to setup a class and provide whiteboards to all their students. I learned about this tool from a colleague who teaches middle school, but I believe it could be adapted for the college classroom. Another tool for supporting collaboration is Padlet (<https://padlet.com>). There are apps for most devices and most file types are supported. If your class is using Zoom for synchronous learning, you could also make use of the breakout rooms for group work. If you are not using Zoom, with a bit of prep work, it is possible to set up breakout rooms using Google Hangouts. Since it is possible to set the size of the breakout rooms, you are able to do a “think-pair-share” activity with 2 students per group or assign more students for an activity that needs more time.

Active learning activities do not need to be synchronous. Google docs are great for encouraging collaboration and group problem solving. If you were using video lectures as a part of your instruction, setting up a Google doc for students to ask questions and help each other understand the concepts encourages collaboration and communication. Google slides can be used for students to collaborate on a presentation which could be viewed and commented on over a period of time..

Let’s continue this conversation about active learning and tools to support group work on the StatPREP community!



# MAA CONNECT

## Need Help Joining?

[Getting Started Guide](#)

[Getting Started Video](#)

[StatPREP October Webinar](#)

# ACTIVITIES FOR NEW LITTLE APPS

BY KATHRYN KOZAK

Last April, StatPREP introduced the new generation of Little Apps. The new generation fixed the connection issues that faculty were dealing with using the original Little Apps, added more datasets, and allowed users to add their own datasets. These new capabilities have expanded the usefulness of the Little Apps in demonstrating data-centric statistics to introductory statistics students. The new generation of Little Apps are available at <https://statprep.github.io/LittleAppSite/>.

The original Little Apps had activities that could be used in classes to help visualize statistical concepts. These activities can be used as group projects or as instructor led discussions. This works in online classes, in person classes, or remote classes. The activities for the original Little Apps have been updated recently to work with the new Little Apps.

Each new Little App is accessed through an ordinary web link and explores a particular statistical methodology, technique, or graphic. Some of the Apps display techniques that will fit into just about any existing intro stats course.

1. Center and Spread
2. Points and Densities
3. Confidence and T

Others are oriented to contemporary approaches to teaching statistics.

4. Resampling

Still others implement topics that can help instructors adopt to recent calls for change such as the GAISE recommendations about multivariate thinking and the American Statistical Association's posture on p-values.

5. Stratification and Confounding
6. Regression Modeling

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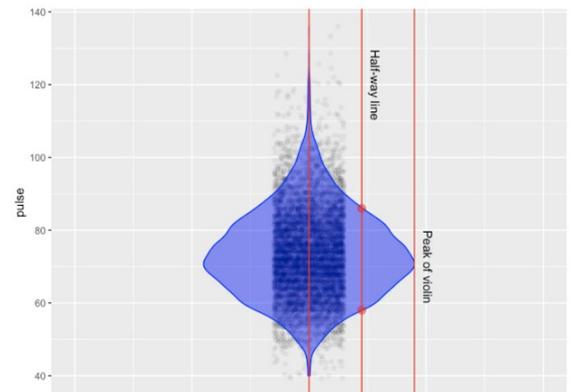
# ACTIVITIES FOR NEW LITTLE APPS

## Continued...

The activities utilize one of the Little Apps. The activities for understanding data and graphical and numerical descriptions of data: Data and point plots, Response and explanatory variables, Shapes of distributions, and Comparing two groups,

### Shapes of distributions

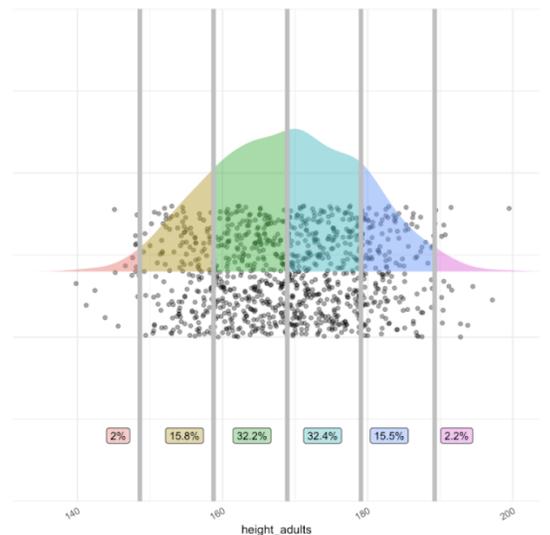
Introduces terms such as skew, bi-modal, and flat, by reference to the difference of the actual variable from a theoretical normal distribution.



Activities that are useful when introducing the normal curve are: Common and rare, Parameters of the normal distribution.

### Parameters of the normal distribution

Normal distributions are a \*family\*. The specific members of the family are identified by two parameters: the mean and the standard deviation.

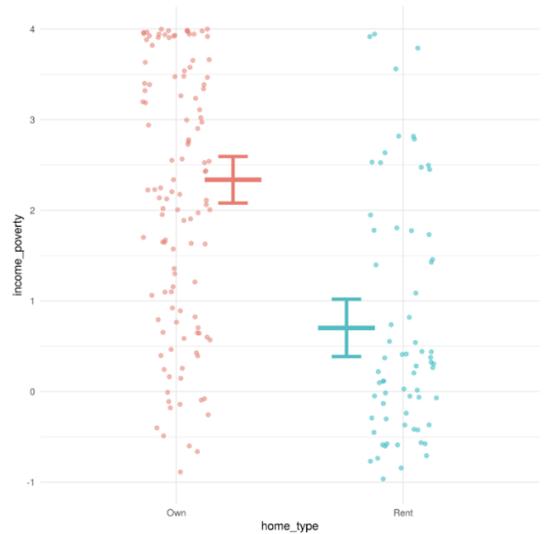


# ACTIVITIES FOR NEW LITTLE APPS Continued...

Activities to help introduce hypothesis testing and confidence intervals are: What is a confidence Interval, Comparing two confidence Intervals, Sampling bias and the confidence interval.

## What is a confidence interval?

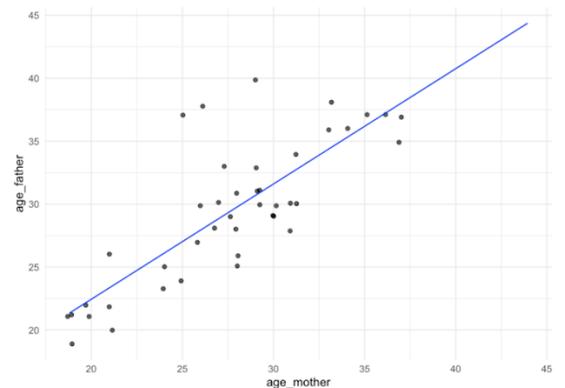
Describes the desired behavior of a confidence interval, that is, how to know whether a procedure produces a valid confidence interval.



Activities to use when discussing linear regression: Introducing linear regression, Describing relationship patterns with words and numbers, Response and explanatory variables, Intervention and prediction, How much is explained.

## Describing relationship patterns in words and numbers

Translating a regression line into a description in everyday terms



Each activity has a Word and PDF version that you can download and post in your learning management system, or you can give your students the link to the website.

# UPCOMING EVENTS

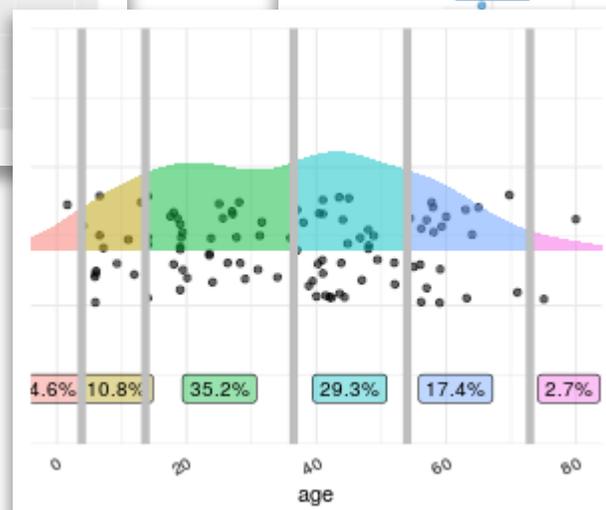
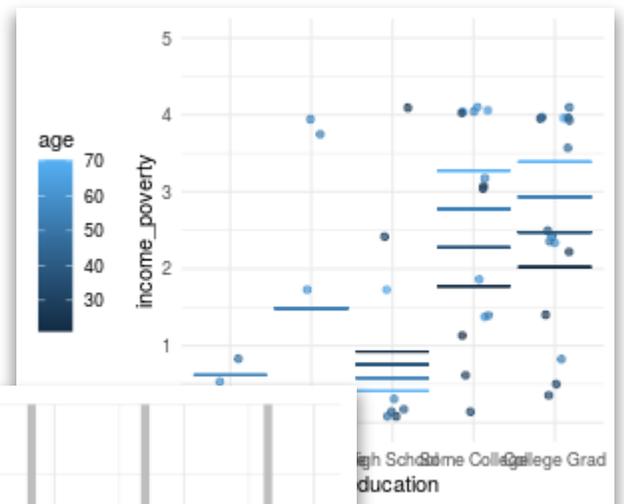
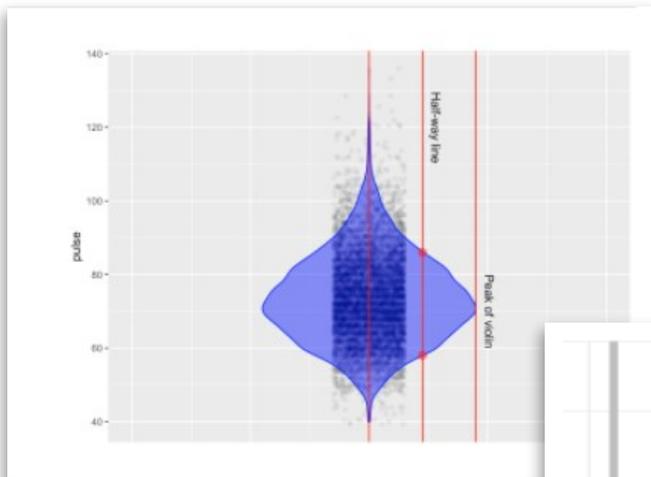
THURSDAY, SEPTEMBER 17

1 PM ET

*Activities for Little Apps*

Host: Kate Kozak

In April, we had a webinar to present the new Little Apps for StatPREP, which you can view here: <http://statprep.org/webinar-series/>. Now, we have created new activities for you to use with the new versions of the apps. Come to this webinar to learn all about them! Several activities will be presented, with applications of how to use them in class.



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