

# Release notes for StatCrunch September 2015 updates

This document describes the September 2015 StatCrunch updates.

## Major additions:

- Maps of U.S. locations now allow for a sizing variable to be used. When this variable is specified, the size of the points will be determined by the corresponding value in the size column. See page 2 for more details.
- Resampling applets have been significantly upgraded to improve speed and graphics. These applets were also updated so that the observed statistic is more nicely formatted. As part of the speed upgrades, the simulation process has been modified so that the use of fixed seeds will give different results now than in previous versions.
- The hypergeometric distribution has been added to the list of distributions available under *Data > Simulate*.
- The *Fair dice?* applet has been added to the new *Applets > Games* menu. This applet challenges users to study dice from several companies to see which company produces fair dice. See page 3 for details.
- The *Are you a psychic?* applet has been added to the new *Applets > Games* menu. This applet challenges users to test their psychic abilities by predicting the outcomes of virtual coin tosses. See page 4 for details.

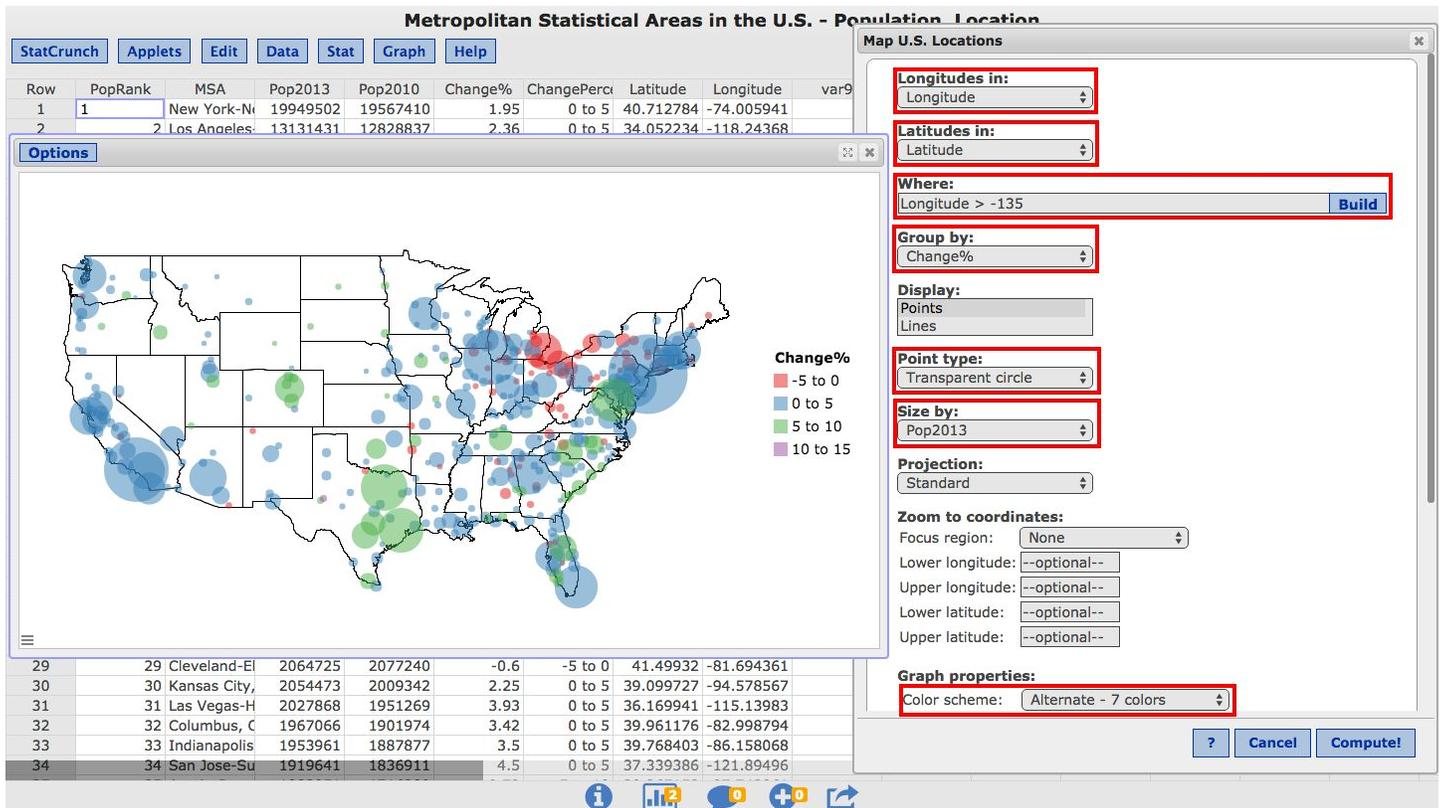
## Minor fixes and enhancements:

- The functions *dyhyper*, *phyper*, *qhyper* and *rhypcr* have been added to StatCrunch expressions. These hypergeometric functions compute the distribution function, the cumulative distribution function, the quantile function and random samples, respectively.
- A recent dotplot bug which caused point sizing to be ignored was fixed.
- A bug when using a Bonne projection with maps of U.S. locations was fixed.
- Selected items now receive priority when hovering over objects in StatCrunch graphs.
- The procedure that StatCrunch uses to guess the best delimiter for an uploaded data file has been updated to offer better results.
- A bug impacting the use of two or more hypergeometric calculators simultaneously has been fixed.

# Sizing points when plotting maps of US locations

Similar to the new bubble plot in StatCrunch, the **Graph > Maps > US Locations** procedure now offers the ability to size the points plotted on a US map based on the values of a variable. The example below illustrates the power of this feature. In this example, a map is constructed using the population information in the [Metropolitan Statistical Areas in the U.S. - Population, Location](#) data set shared at statcrunch.com. The locations of the points on the map are determined by the *Longitude* and *Latitude* columns selected for **Longitudes in** and **Latitudes in**. A **Where** expression of *Longitude > -135* is used to exclude metropolitan areas outside the mainland United States. The **Change%** column is selected as the **Group by** column to color-code the points based on their percent change in population from 2010 to 2013. The **Size by** column is set to *Pop2013* so that the points will be sized by their population in 2013. The **Point type** is set to *transparent circle* so that larger points will not completely obscure other points in their vicinity. The color scheme selected is the *Alternate - 7 colors* scheme.

The resulting graph below shows that the population of most of the largest metropolitan areas grew in the 0% to 5% range over this time period. The rust belt region sticks out for its declining population (shown in red) whereas a number of metropolitan areas in Colorado, Texas and North Carolina show strong population growth in the 5% to 10% range (shown in green). The smaller metropolitan areas of Midland, Texas and The Villages, Florida are the only points in purple indicating extreme population growth in the 10% to 15% range.

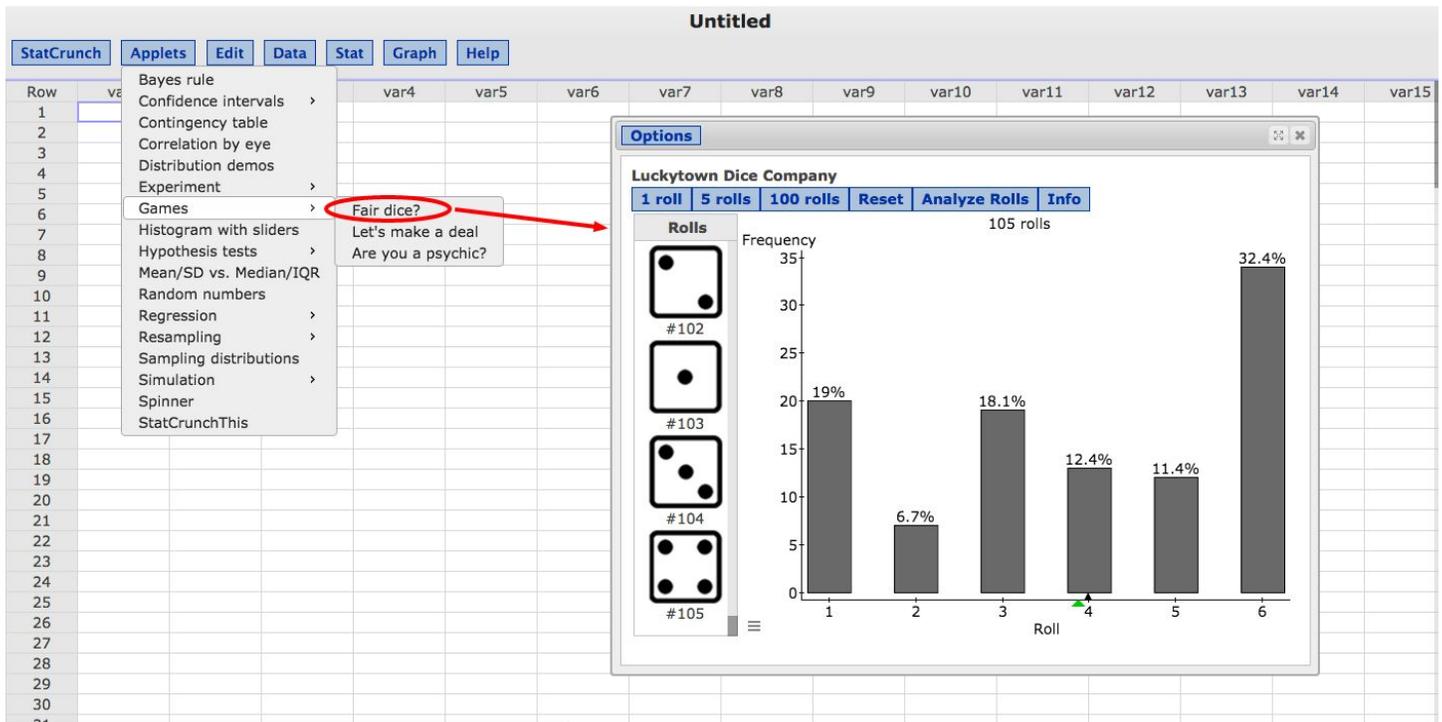


# The Fair Dice? Applet

A new *Fair dice?* applet is now available under **Applets > Games > Fair dice?**. This applet sets up a scenario where there are six different dice companies that each produce six-sided dice. When working with the applet, the user's goal is to determine which companies produce fair dice. A fair die is characterized by equally likely outcomes one through six. To make this determination, the user must repeatedly roll dice from each manufacturer and consider the observed frequencies of the outcomes.

As shown below, this applet allows for exploring the dice for one company at a time. Dice rolls are simulated by pressing the **1 roll**, **5 rolls**, or **100 rolls** buttons. The **1 roll** and **5 rolls** buttons will animate the rolling of the dice at different speeds. The history of the dice rolls is recorded in the column on the left while the summary information for each outcome is displayed in the bar graph. The **Analyze Rolls** button will import the dice rolls into the data table where they can then be used with other routines in StatCrunch.

Use the applet attempt to determine which manufacturers produce fair dice. How many dice rolls are required to make this determination? For manufacturers producing unfair dice, characterize the distribution of their outcomes.



# The *Are you a psychic?* Applet

The new applet found under **Applets > Games > Are you a psychic?** tests the user's ability to predict the outcome of a virtual coin flip. The initial dialog window allows for changing the probability of a head on the virtual coin flip, with the default probability being 0.5 reflecting a fair coin with an even chance of heads or tails.

The resulting applet shown below invites the user to click either **Head** or **Tail** to indicate their guess at the outcome of the next flip of the coin. After the user makes their guess, their prediction is compared with the result of an animated coin flip to determine if the guess was correct or incorrect. The graph at the bottom keeps track of the user's results by showing the proportion of correct guesses versus the number of guesses. The red line represents the best long term proportion that can be achieved by using an optimal strategy without any psychic ability. Do you think you are psychic? Try to get a proportion correct that is "significantly" higher than the red line value after 50 or more guesses.

The screenshot shows the StatCrunch software interface. The 'Applets' menu is open, and 'Are you a psychic?' is circled in red. A red arrow points from this menu item to the applet dialog box. The dialog box is titled 'Options' and contains the following information:

- Reset** **Analyze** **Info**
- Guess:** What will be the outcome of the next flip?  
**Head**  
**Tail**
- Last result:** You guessed head.  
  
Wrong! Guess again!
- 13 correct out of 30 flips
- Graph: Prop. correct vs # of guesses. The y-axis ranges from 0 to 1.0, and the x-axis ranges from 0 to 30. A red horizontal line is drawn at 0.5. The data points fluctuate around this line, ending at approximately 0.43 after 30 guesses.