

UnPacking the Hat

Tammy Guthrie

Tyson Middle School

TinkerPlots introduces a representation of variability termed a hat plot. Interpretation of the percentile hat plot requires students to understand the relationship between counts of ordered data and distances between quartiles. For example, the width of the percentile hat is the interquartile range—the distance between the case defining the start of the second quartile and the case defining the end of the third quartile: the “mid-50%.” Many students expect that the distance between the median and the second quartile will be the same as the distance between the median and the third quartile. For the box plot, students also often expect that distances between each quartile and the median will be about the same, so I find it helpful to ask questions like these about both percentile hat and box plots:

Referring to a data display of either measurements, or of a production process like the rate walk, I ask:

- How do we find the first quartile? Can we use the Divider tool to find it?
- How many pieces of data are between the 1st quartile and the median?
- The median and the 3rd quartile?
- Use the Ruler tool to find the distance between the median and the 1st quartile. What is that distance?
- What is the distance between the median and the 3rd quartile?
- If the number of data values in both quartiles is the same, then why aren't the two sides of the hat always the same distance from the median?

Then I ask about the brim of the hat:

- What is the distance between the median and the highest measurement?
- The lowest measurement? Must they be the same? Why not?

To get some practice using the Ruler and Divider tools in TinkerPlots, I ask students to use these tools to answer the questions, but some students prefer to use paper to get a better sense of what is going on.