Improving Preservice Teachers Data Visualization

Michael Daiga Ph.D.
Wittenberg University
Associate Professor
daigam@wittenberg.edu

The Problem

Future elementary teachers are often not exposed to analyzing quantitative data through visuals.

Learning Sequence

Expose preservice teachers to data visualization through a meaningful context for undergraduates in Ohio: roller coasters.

Related Publications

Visualizing the Arithmetic Mean
Published in *Mathematics Teacher: Learning and Teaching PK-12*.
Michael Daiga, Wittenberg University
Shannon Driskell, University of Dayton

Preservice Teachers Knowledge and Use of Transnumeration
Published and available through the International Association for Statistics Education.
Michael Daiga, Wittenberg University

Looking Beyond Graphical Representations with Transnumeration
Published in the *116th Proceedings of the School Science and Mathematics Association*.
Michael Daiga, Wittenberg University

ROLLER COASTER EXPLORATION

Launch During Class with Investigating Old Rollercoasters Data Set

### End Class by Assigning Investigating More Roller Coasters Data Set

1) **Speed and Age:** How fast is the fastest roller coaster? Do newer roller coasters seem to have a higher top speed than older ones? Drag the column header "Age Group" to y-axis to create separate dotplots by age and use a tool in CODAP to support your written work.
2) **Speed and Building Material:** Drag the column header "Type" to the center of the graph. This will color the dots according to their building material. Are newer roller coasters more likely to be made of steel? What about roller coasters with a high top-speed?
3) **Design Height and Inversion:** Do wooden coasters tend to have the same height as coasters made from steel? Is the type of material used to make a roller coaster related to whether or not the passengers get inverted during a ride?
4) **Maximum Height and Track Length:** Is there a relationship between top speed and maximum height? If a roller coaster has a long track length, is it also likely to have a large drop?
5) **Further Interest:** State a question you are interested in with this dataset and then answer it. Be sure to provide another graph from CODAP for this response to support your answer.

Is there a relationship between top speed and maximum height?

$Max\_Height = (4.09\ ft/mph)$
$r^2 = 0.79$
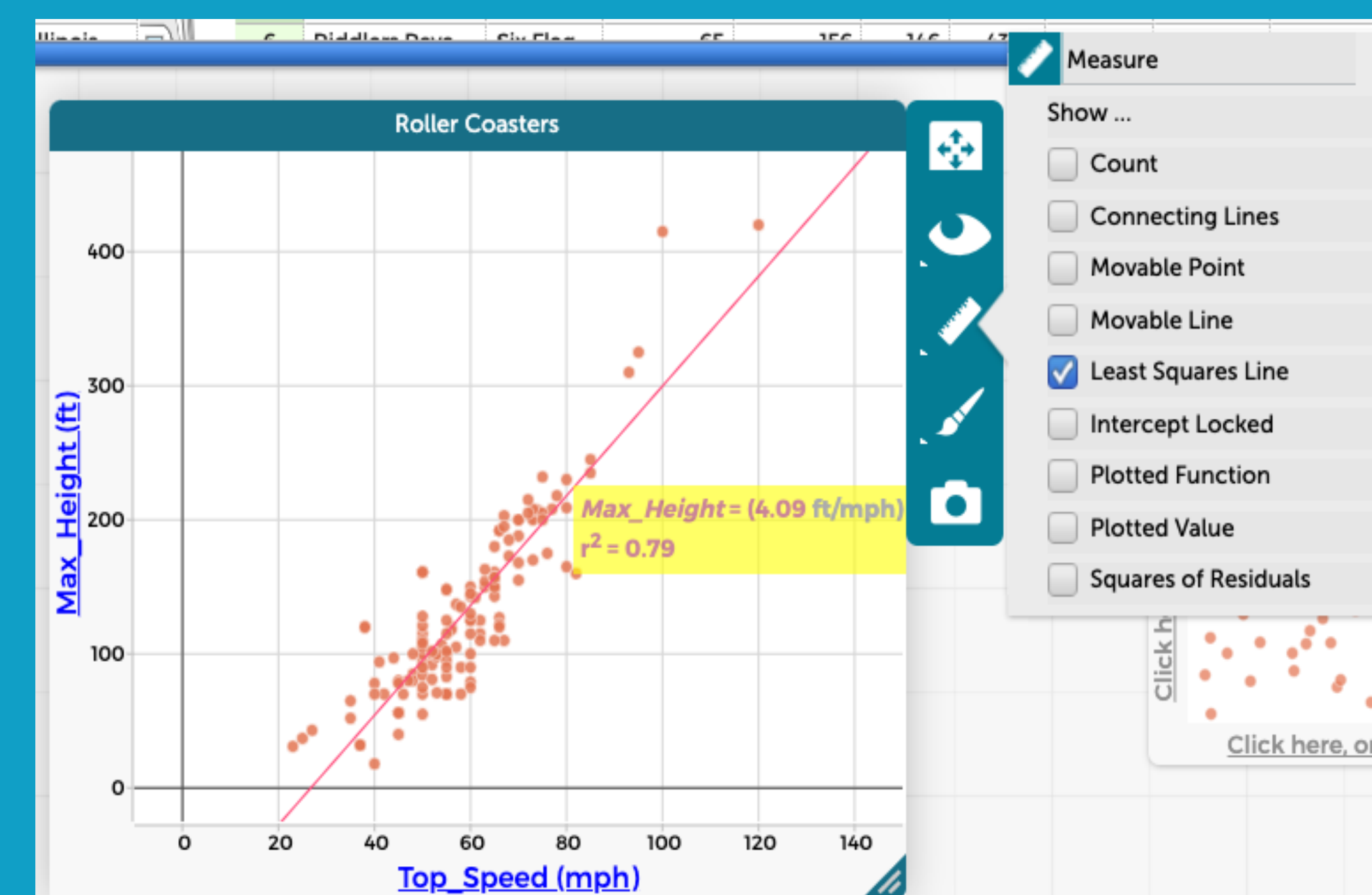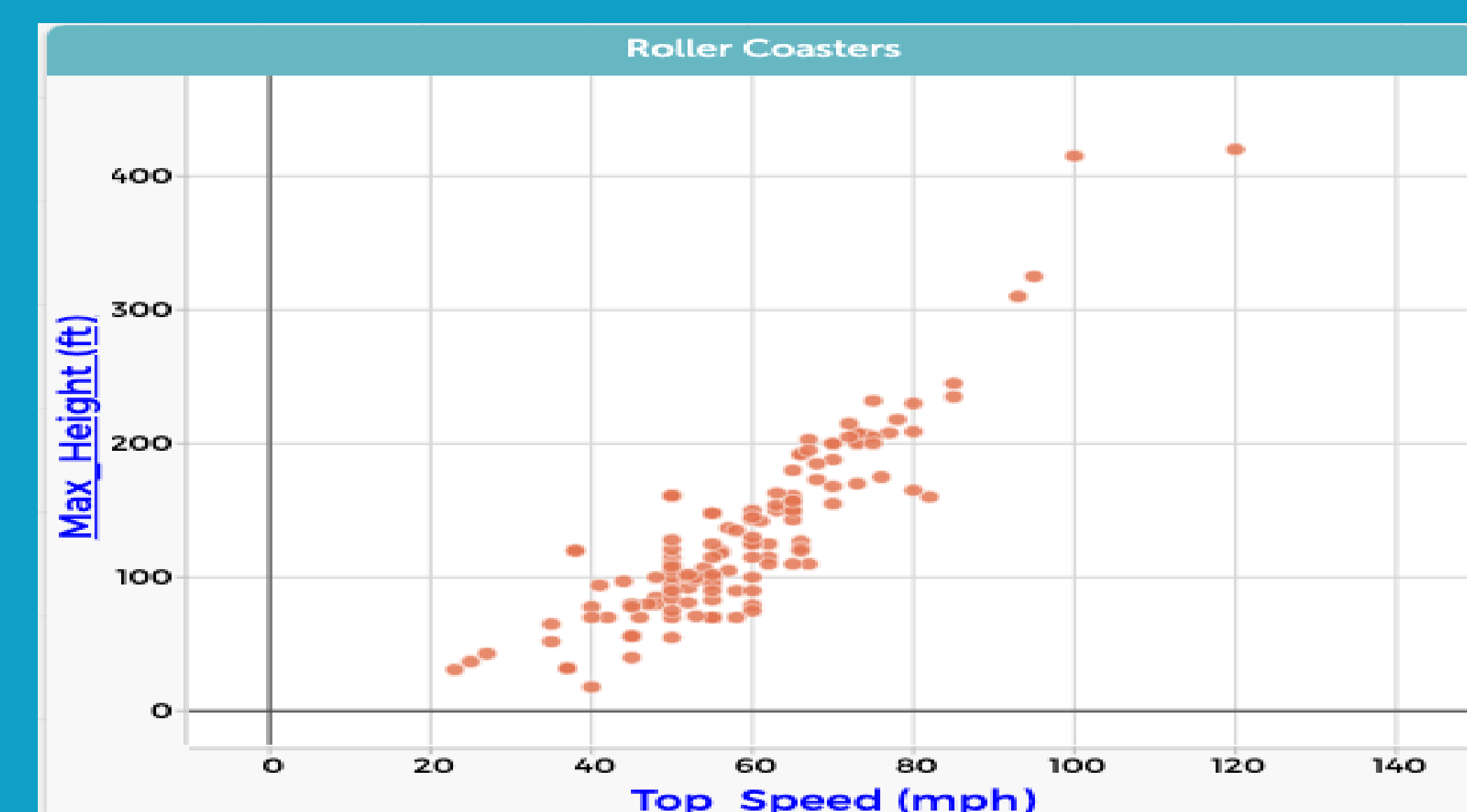
How does track length of roller coasters vary across different groups?
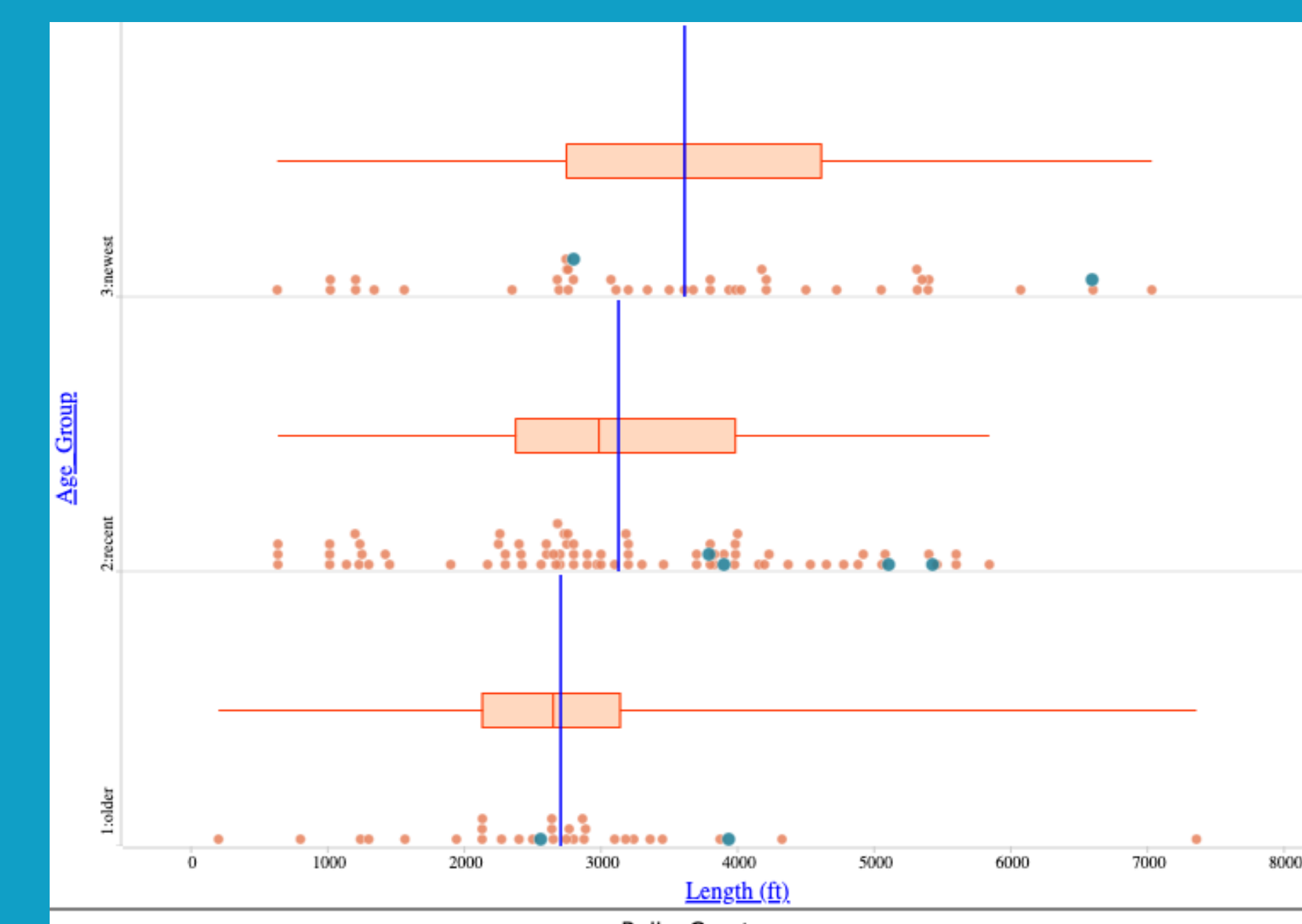
Rubric Assessment

Vocab Involving Data	•Language •Syntax
Visuals	•Meaningful •Useful for prose
Data Analysis	•Multiple angles •CODAP tools

Extending to Future Classes

CODAP's Vehicle Exploration provides a second exposure: Can we tell if automatic or manual vehicles tend to have better city fuel efficiency?