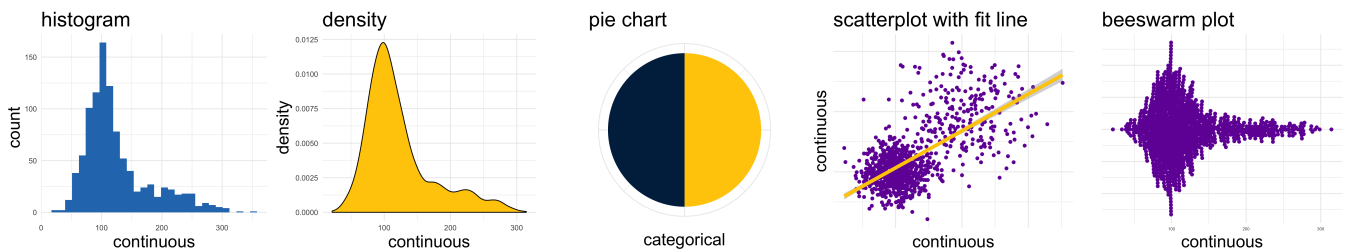


How to Choose a Chart

A Statistically Motivated Guide

Andy Grogan-Kaylor

July 04, 2018



How to Choose a Chart

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Choosing the right chart to represent your data can be a daunting process. I believe that a *starting point* for this thinking is some basic statistical thinking about the *type* of variables that you have. At the broadest level, variables may be conceptualized as *categorical* variables, or *continuous* variables.

- *categorical variables* represent unordered categories like *gender*, or *religious affiliation*.
- *continuous variables* represent a continuous scale like a *mental health scale*, or a *measure of neighborhood quality*.

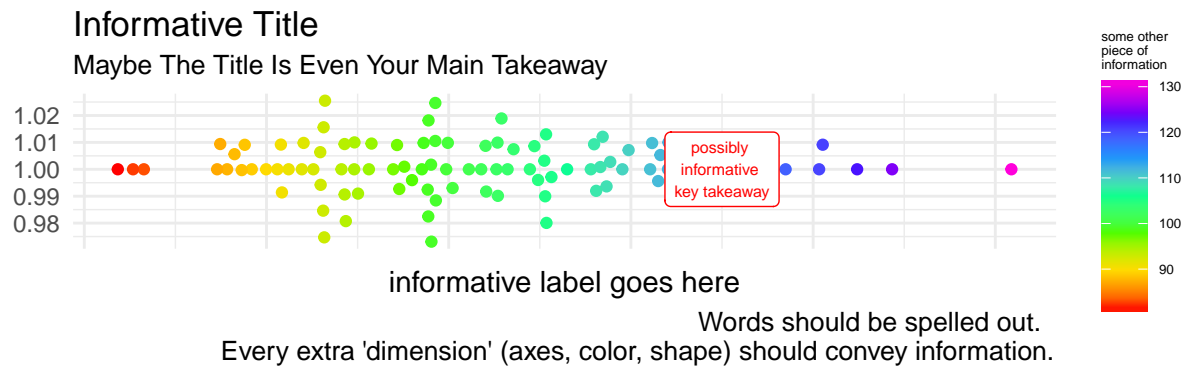
Once we have discerned the type of variable that have, there are two followup questions we may ask before deciding upon a chart strategy:

- Is our graph about **one thing at a time**?
 - How much of x is there?
 - What is the distribution of x ?
- Is our graph about **two things at a time**?
 - What is the relationship of x and y ?
 - How are x and y associated?

A Few Notes

A Note About Graph Labels

Graphs should have clear titles and labels.



A Note About Software

The principles of graphing discussed in this document transcend any particular software package, and could be implemented in many different software packages, such as SPSS, SAS, Stata, or R.

The graphs in these particular examples use ggplot2, a graphing library in R. ggplot2 graph syntax can be formidably complex, with a somewhat steep learning curve. More information about ggplot can be found here.

A Note About Graph Colors

This document uses colors based upon official University of Michigan colors. Using colors that match the design scheme of your organization may be helpful.

A Simulated Data File of Continuous and Categorical Data

A few randomly selected observations...

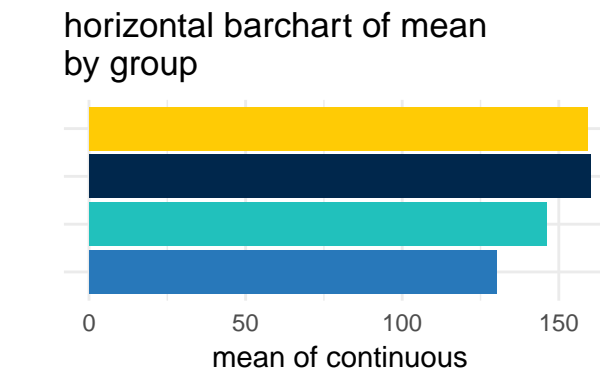
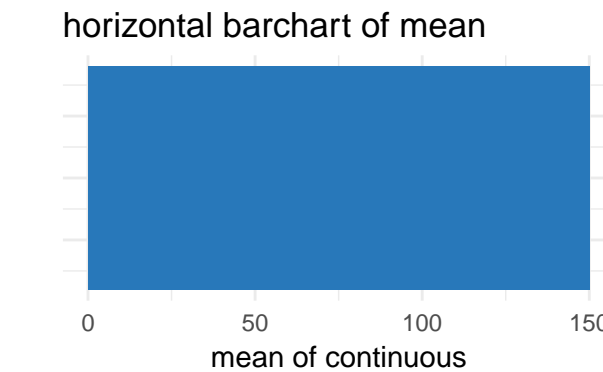
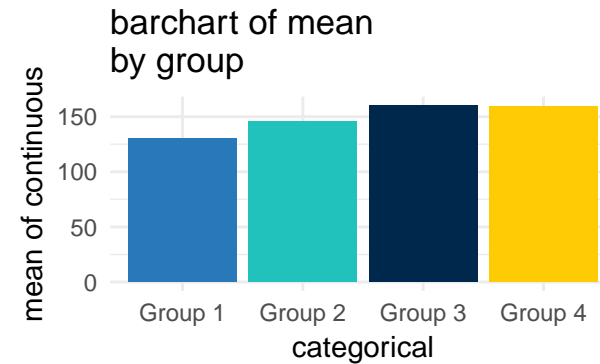
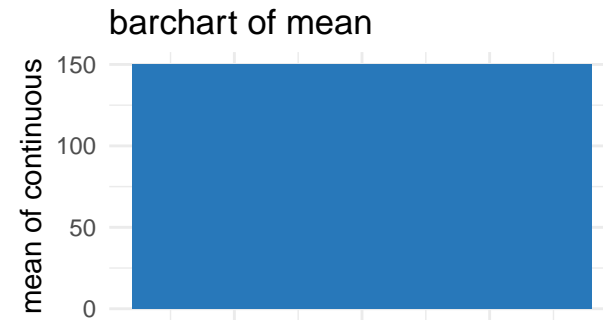
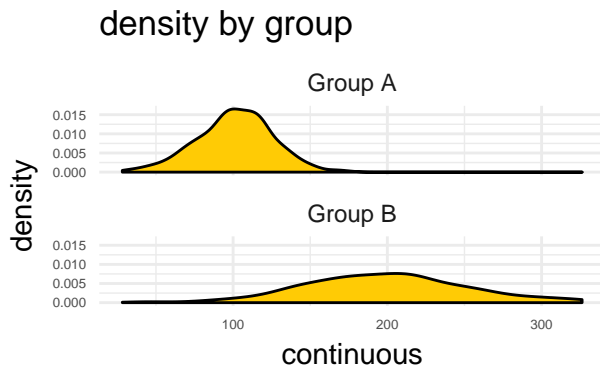
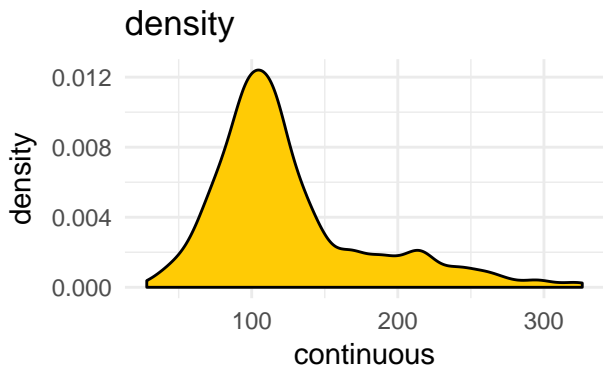
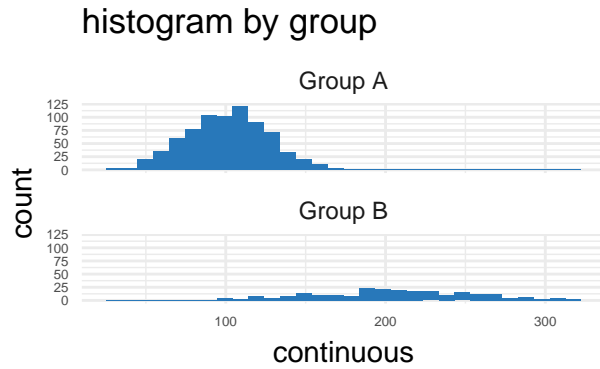
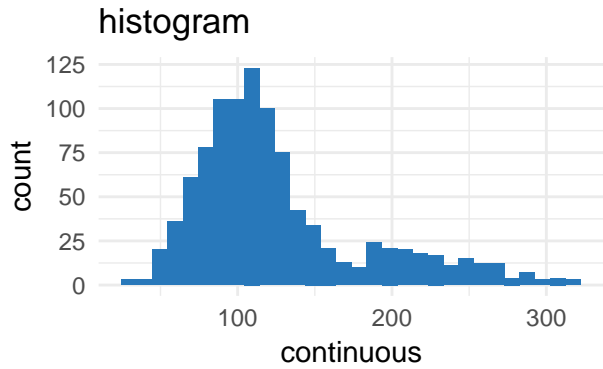
	x	y	z	u	v	w	s	q
69	137.4	130	99.28	Group A	Group A	Group A	Group 2	157.4
787	213.3	232.3	105.3	Group B	Group A	Group B	Group 1	223.3
179	113.1	103.6	121.2	Group B	Group B	Group A	Group 2	133.1
728	69.58	108	122.2	Group B	Group A	Group A	Group 1	79.58
703	29.66	94.48	88.67	Group B	Group A	Group A	Group 2	49.66
380	106.5	72.78	101.5	Group A	Group B	Group A	Group 3	136.5
612	244.5	189	104.3	Group A	Group A	Group B	Group 4	284.5
449	95.72	145.9	87.3	Group A	Group A	Group A	Group 3	125.7
513	103.4	88.31	127.3	Group A	Group A	Group A	Group 1	113.4
634	169.5	128.1	161.6	Group A	Group A	Group A	Group 3	199.5

One Thing At A Time

Two Things At A Time

Continuous

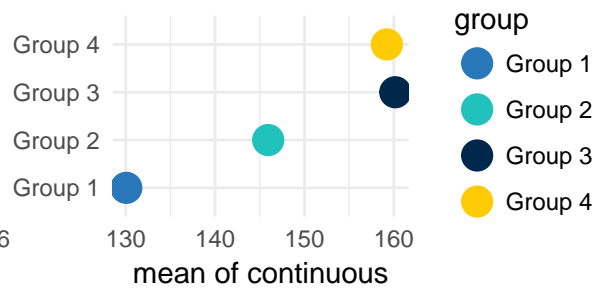
Continuous By Categorical



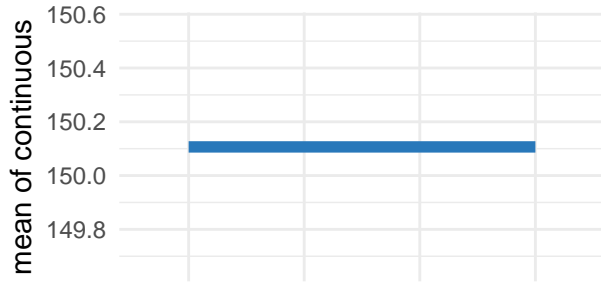
horizontal dotchart of mean



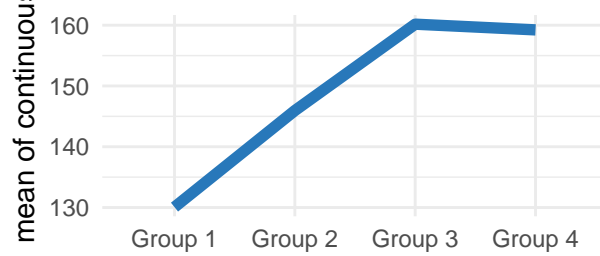
horizontal dotchart of mean by group



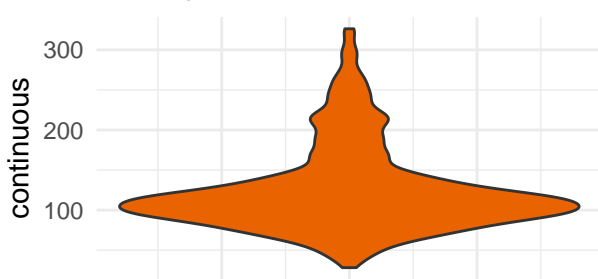
linechart of mean



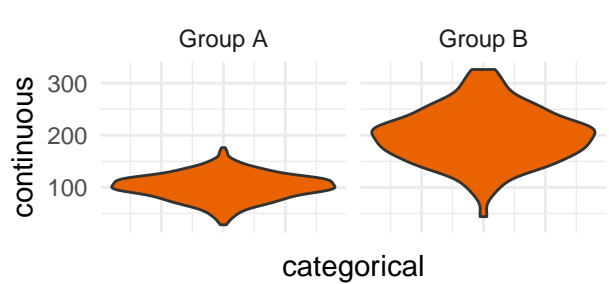
linechart of mean by group



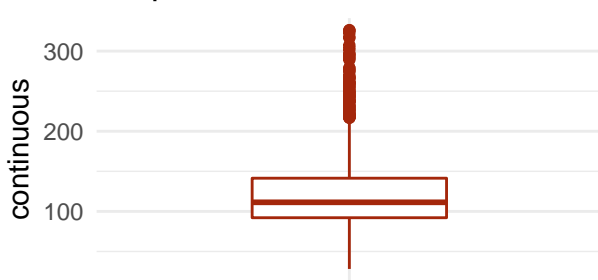
violin plot



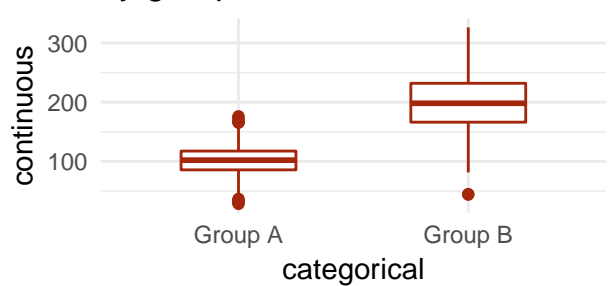
violin plot by group



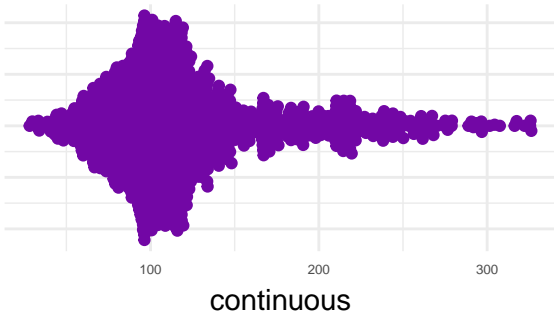
boxplot



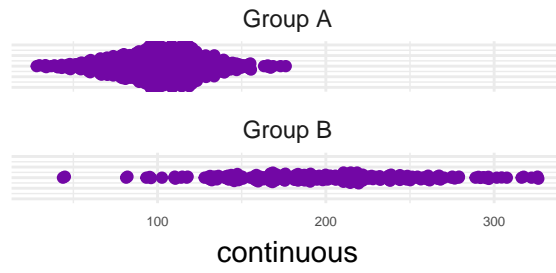
boxplot by group



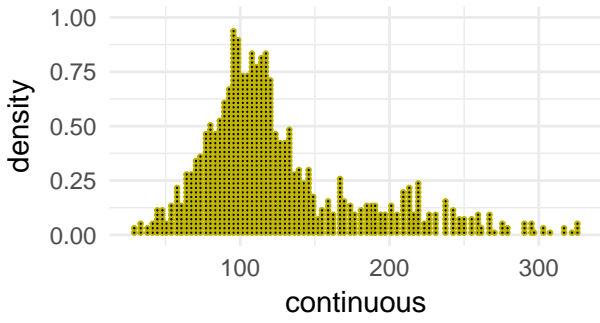
beeswarm plot



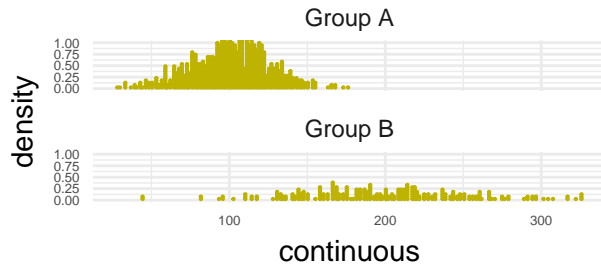
beeswarm plot by group



dotplot



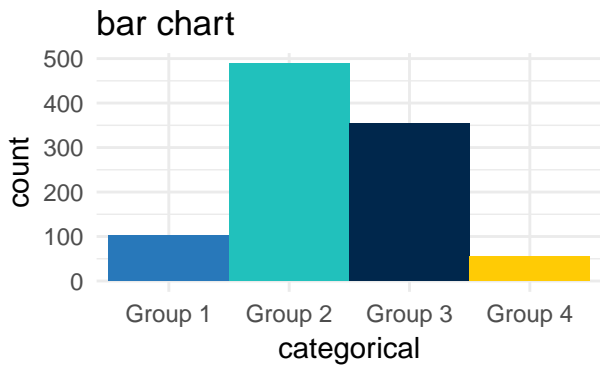
dotplot by group



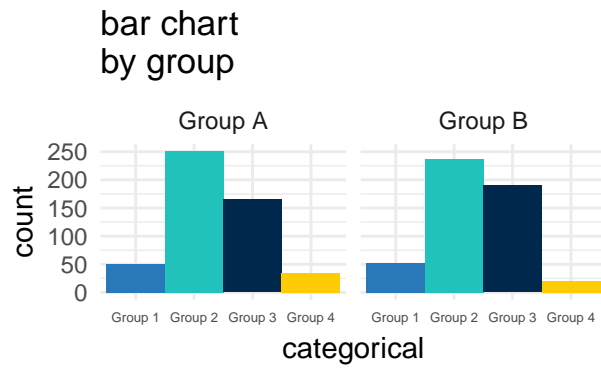
One Thing At A Time

Two Things At A Time

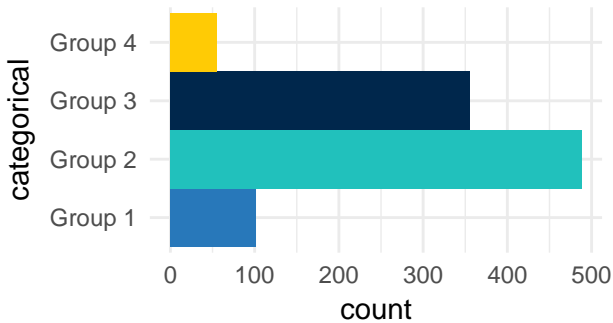
Categorical



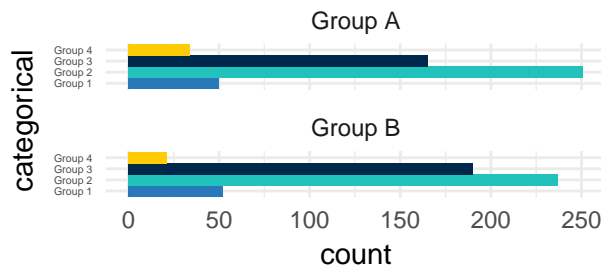
Categorical By Categorical



horizontal bar chart



horizontal bar chart by group



pie chart



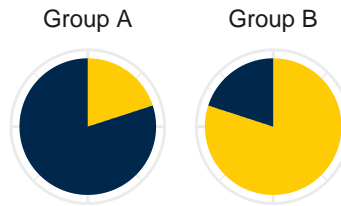
categorical

doughnut chart



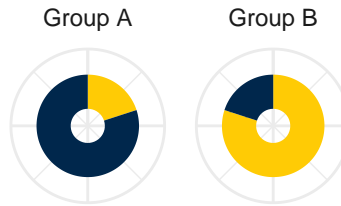
categorical

pie chart by group



categorical

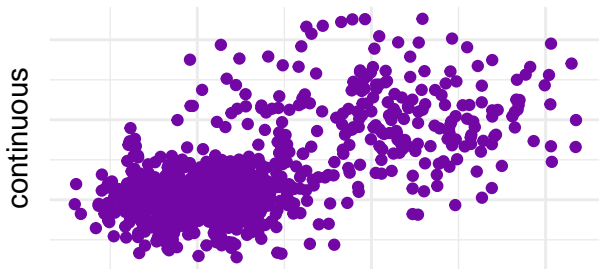
doughnut chart by group



categorical

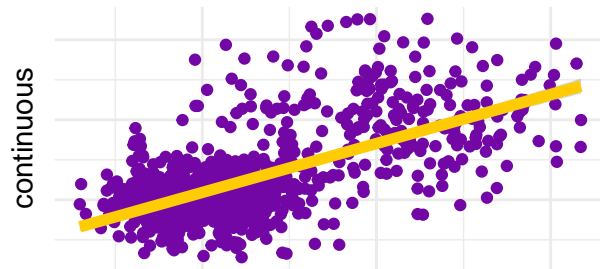
Continuous by Continuous

scatterplot



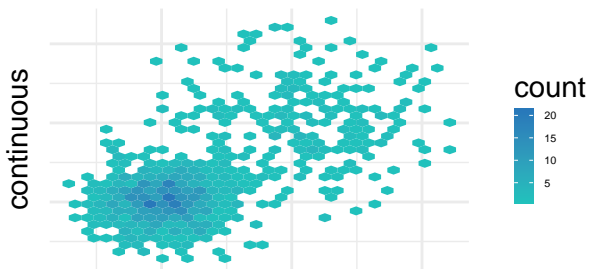
continuous

scatterplot with fit line



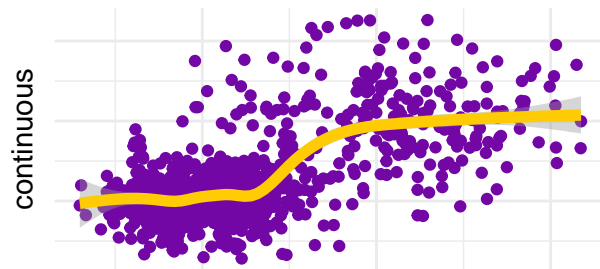
continuous

hexagon plot



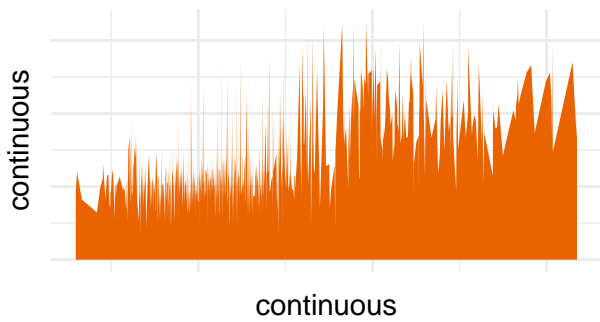
continuous

scatterplot with smoother

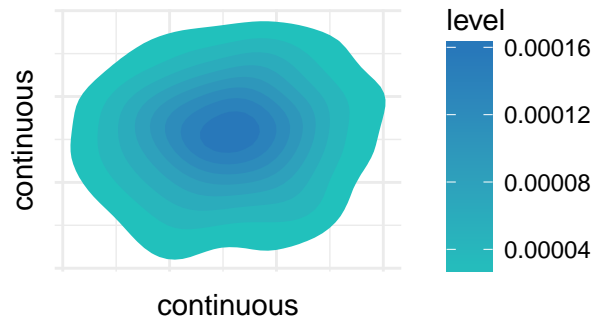


continuous

area plot



contour plot



Graphics made with the ggplot2 graphing library created by Hadley Wickham.

Available online at <https://agroganweb.wordpress.com/data-visualization-dataviz/>

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