

Quantitative Variables: Histograms

Lecture 3

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Outline

- 1 Quantitative Variables
- 2 Histograms
 - Creating a Histogram
- 3 Assignment

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Quantitative Variables

- The values of a quantitative variable are numbers along the number line.
- They have a natural order and they lie on a continuum.
- Any graphical display of a quantitative variable should maintain that order and indicate the continuum.

Example

Example (Age Distribution in US)

Age	Count	Age	Count
0 - 4	20.20	50 - 54	22.30
5 - 9	20.35	55 - 59	19.66
10 - 14	20.68	60 - 64	16.82
15 - 19	22.04	65 - 69	12.44
20 - 24	21.59	70 - 74	9.28
25 - 29	21.10	75 - 79	7.32
30 - 34	19.96	80 - 84	5.74
35 - 39	20.18	85 - 89	3.62
40 - 44	20.89	90 - 94	1.45
45 - 49	22.71	95 - 99	0.37

Numbers expressed in millions.

Example

Example (Percent Born Outside US)

State	Perc	State	Perc	State	Perc	State	Perc
AL	2.8	IN	4.2	NE	5.6	SC	4.1
AK	7.0	IA	3.8	NV	19.1	SD	2.2
AZ	15.1	KS	6.3	NH	5.4	TN	3.9
AR	3.8	KY	2.7	NJ	20.1	TX	15.9
CA	27.2	LA	2.9	NM	10.1	UT	8.3
CO	10.3	ME	3.2	NY	21.6	VT	3.9
CT	12.9	MD	12.2	NC	6.9	VA	10.1
DE	8.1	MA	14.1	ND	2.1	WA	12.4
FL	18.9	MI	5.9	OH	3.6	WV	1.2
GA	9.2	MN	6.6	OK	4.9	WI	4.4
HI	16.3	MS	1.8	OR	9.7	WY	2.7
ID	5.6	MO	3.3	PA	5.1		
IL	13.8	MT	1.9	RI	12.6		

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2 **Histograms**

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Histogram

Definition (Histogram)

A **histogram** of a quantitative variable is a display in which the range of values of the variable is divided into a number of **classes**, or intervals. Over each interval, a rectangle is drawn whose height represents the count of individuals in that class.

- To indicate the continuum, the rectangles in a histogram should abut.
- Note: in a bar graph, there should be a gap between adjacent bars (separate categories).

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Creating a Histogram

- Steps to create a histogram.
 - 1 **Choose the classes** – Divide the range of data into classes of equal width.
 - 2 **Count the individuals** – In each class, count the number of individuals in that class.
 - 3 **Draw the histogram** – Mark the class boundaries on the horizontal scale and the counts on the vertical scale. Draw rectangles of the appropriate heights over the class intervals.

- Some guidelines
 - Use a suitable number of classes – 5 or 6 for very small data sets; never more than 15 or 20.
 - The class intervals should use the same precision (number of decimal places) as is present in the data.
 - At each class boundary, mark the lower boundary of the class to the right (the “nicer” number).

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Assignment

Homework

- Read Chapter 1: Quantitative Variables: Histograms.
- Apply Your Knowledge: 6.
- Check Your Skills: 17.
- Exercises: 34(a), 35.