

# Visualizing data with R and RStudio

ME 447/547

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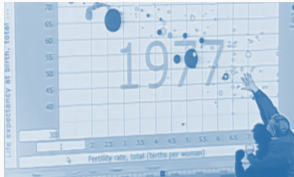
Richard Layton

March 2020

Rose-Hulman Institute of Technology

# This week we encounter the three basic themes of the course

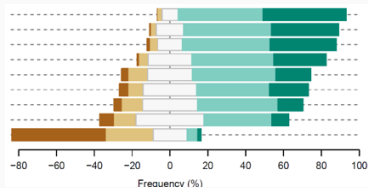
Rhetoric  
(Mon)



Means  
(T/W)



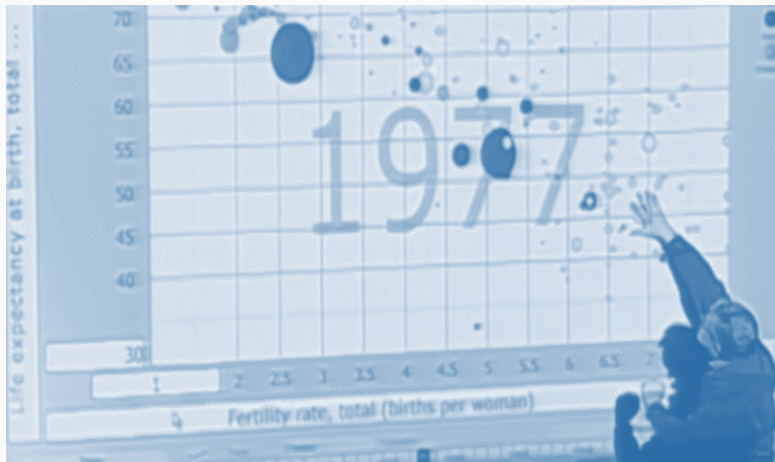
Repertoire  
(Thu)



# Visual rhetoric

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# Designers shape information visually for rhetorical ends



Hans Rosling 2006 TED Talk

# Consider the argument

How did Hans shape the information visually?

What were his rhetorical goals?

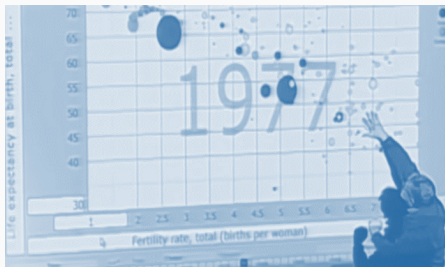


Image: TED2006

# Consider a less credible visual argument

True or False:  $N_{\text{people on welfare}} > N_{\text{people with a full time job}}$

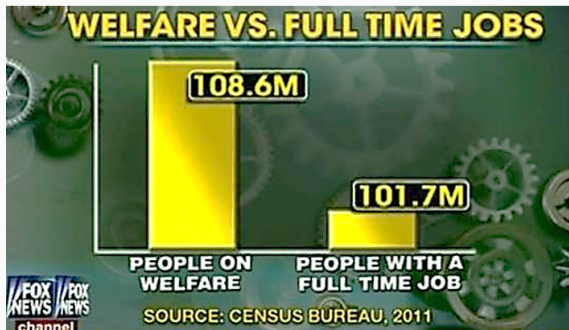


Image: Media Matters

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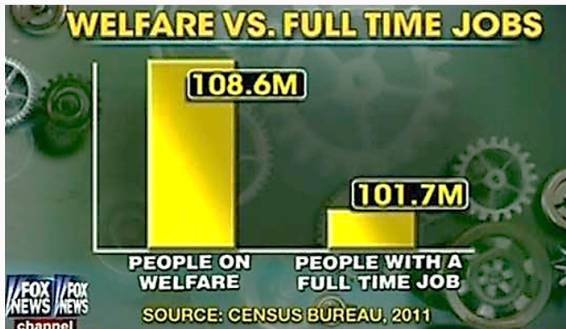
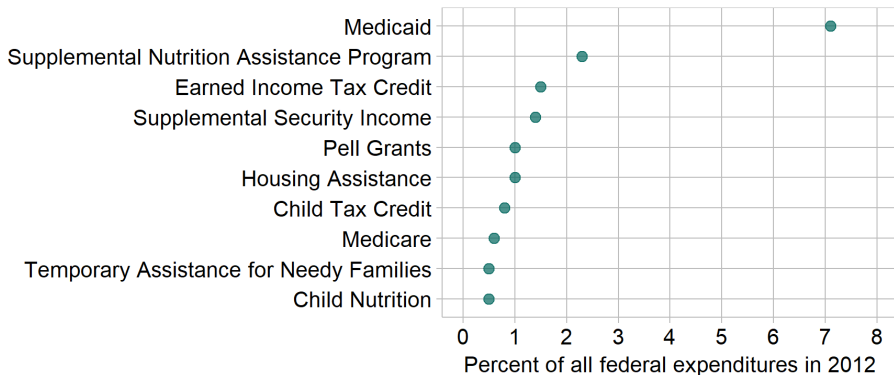


Image: Media Matters

False. One count is artificially high; the other is artificially low.  
The counts use different definitions of “people”.

# What does it mean to receive “welfare” benefits?

## Federal means-tested programs and tax credits

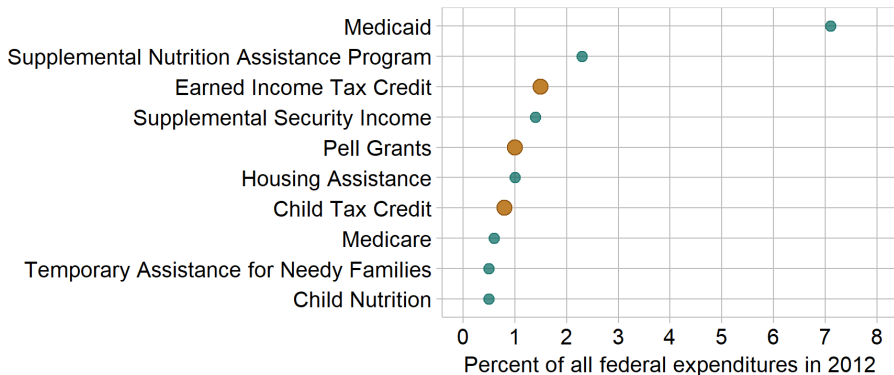


In total, 17% of the 2012 US federal budget (\$590 B / \$3540 B).



# What does it mean to receive “welfare” benefits?

## Federal means-tested programs and tax credits



In total, 17% of the 2012 US federal budget (\$590 B / \$3540 B).

Also, the **visual argument** belies the verbal argument

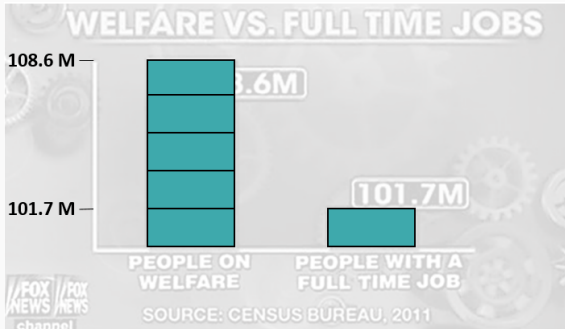
What is the **visual lie**?



# A visual argument prevails—as the designer well knows

**Verbal lie:** 7% more people receiving benefits than not

**Visual lie:** 500% more people receiving benefits than not



What were the designer's rhetorical goals?

# Ethical obligations are inherent in graph design



In data visualization, journalism meets engineering — Alberto Cairo

**journalism** increase knowledge among the public while minimizing harmful side effects

**engineering** give information a visual shape—model it, sculpt it—effectively and efficiently

(Cairo, 2014)

## Course highlights

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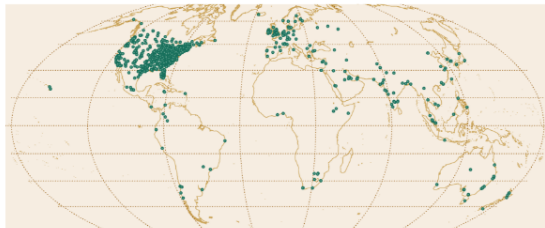
# Course material is on github

<https://github.com/graphdr/visualizing-data>

## visualizing data

447 / 547 Visualizing Data. An introductory course by Richard Layton at Rose-Hulman Institute of Technology.

Institutions using the CATME system



R. Layton. Data from [www.catme.org](http://www.catme.org)


### Introduction


- [About the course](#)
- [Syllabus](#)
- [License](#)


# The main topical threads weave through the calendar

data  
software  
visual rhetoric  
repertoire of graphs  
portfolio


## calendar

 suggested reading in *R for Data Science* (Wickham and Grolemund, [2017](#))

 e-copy on Moodle, with permission

 paper reprint, with permission

 blog reading

w	d	agenda & assignments	milestones
1	M	Visual rhetoric [ <a href="#">slides</a> ] <a href="#">Syllabus highlights</a> (hw) <a href="#">Syllabus</a> (hw) <a href="#">About the course</a> (hw)  Doumont (2009) Designing the graph	
	T	Data structure and graph design [slides] (hw) Complete the data structure worksheets (hw) <a href="#">Install software</a>	
	W lab	<a href="#">Software studio</a> <a href="#">R basics</a>	Software setup co

# References

Cairo A (2014) *Ethical infographics*. The Investigative Reporters and Editors Journal, Spring 2014  
<http://tinyurl.com/y67ye5fy>