

Storytelling with Data

Module 10: Infographics —discussion, reconsidering messaging

Scott Spencer
Faculty and Lecturer
Columbia University



Unanswered, or new, questions from discussion?

Agenda

Upcoming deliverables

Today's objectives

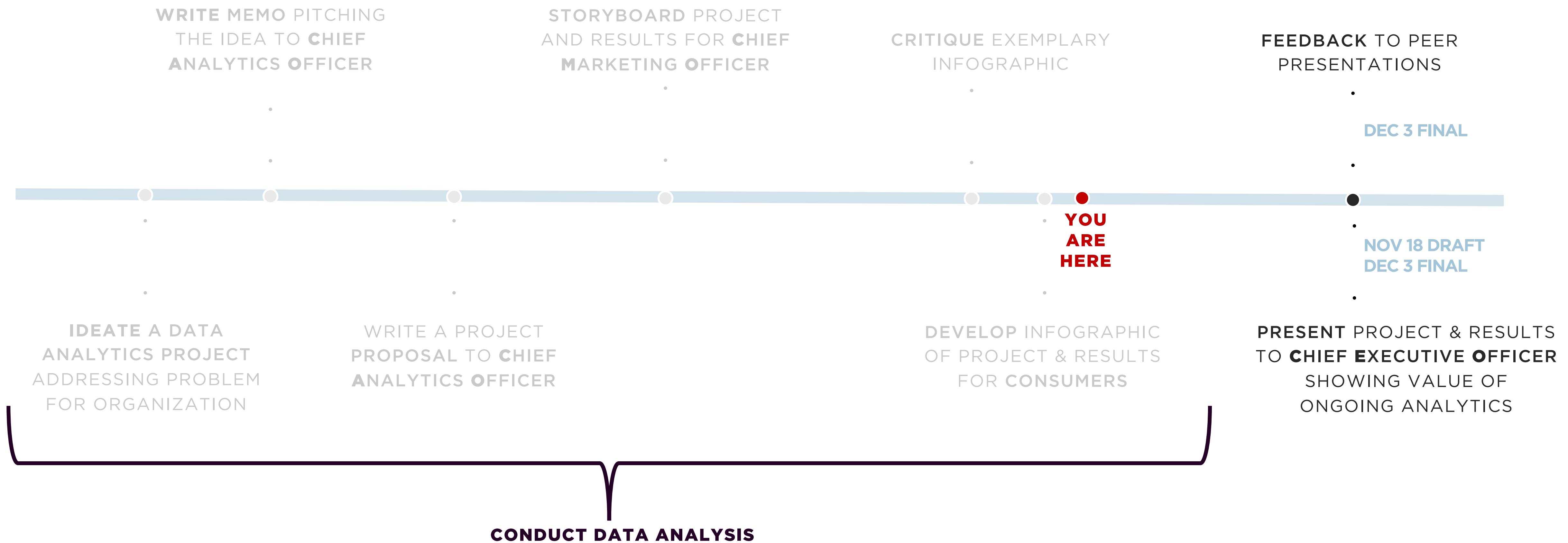
Debriefing on information graphics

Considering uncertainty

Upcoming deliverables

Upcoming deliverables

Persuasive presentation to CEO and Peer Feedback – tell the story of the analytical project that was pitched in the memo and proposal and communicated with consumers in the storyboard and infographic assignments to convince the CEO to invest further in analytics. Provide peer review.



Today's Objectives

Objectives

1

Debriefing and discussion
on information graphics

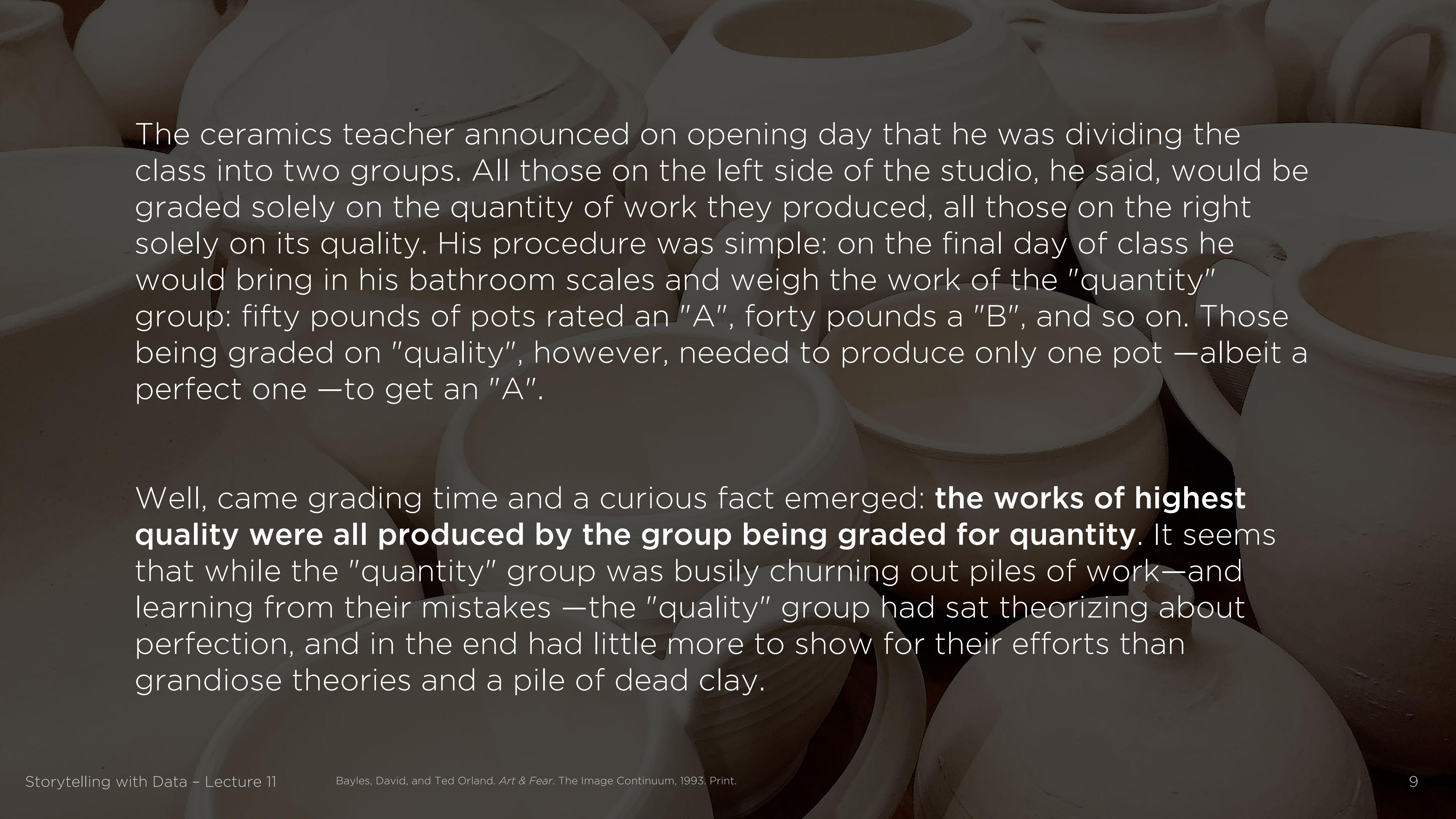
2

Group work—how may past
deliverables be reconsidered as
evidence to help persuade CEO of
further investment in analytics.

3

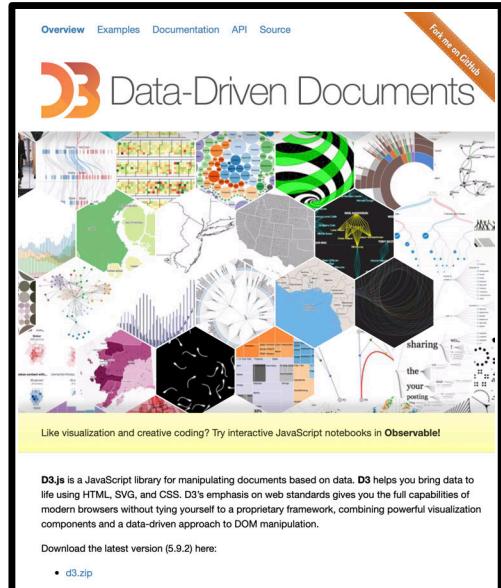
Communicating uncertainty

An iterative approach to preparing communications



The ceramics teacher announced on opening day that he was dividing the class into two groups. All those on the left side of the studio, he said, would be graded solely on the quantity of work they produced, all those on the right solely on its quality. His procedure was simple: on the final day of class he would bring in his bathroom scales and weigh the work of the "quantity" group: fifty pounds of pots rated an "A", forty pounds a "B", and so on. Those being graded on "quality", however, needed to produce only one pot —albeit a perfect one —to get an "A".

Well, came grading time and a curious fact emerged: **the works of highest quality were all produced by the group being graded for quantity**. It seems that while the "quantity" group was busily churning out piles of work—and learning from their mistakes—the "quality" group had sat theorizing about perfection, and in the end had little more to show for their efforts than grandiose theories and a pile of dead clay.



Design is a search problem

Bostock

He is former graphics editor at the New York Times and inventor of the ubiquitous JavaScript library for interactive graphics: D3.js

Get fresh eyes frequently; invite criticism

You are too close to critique your own work well. Evaluation requires an external perspective. Conduct ad hoc user tests. Does your visualization communicate? Is your interface intuitive? Verbalize what does and does not work.

Prototypes should emphasize speed over polish

It needn't look good, or even have labels. Make just enough to evaluate the idea. Then decide whether to go straight or turn. Identify the intent of the prototype. What hypothesis are you testing?

From exploring to refining

Transition from exploring to refining near deadline:

Delete code as you go. Be ruthless.

Make your process reproducible.

Try bad ideas deliberately.

Don't be afraid to fail.



Joe Biden, in Video, Says
He Will Be 'More Mindful'
of Personal Space



Senate Republicans Go
'Nuclear' to Speed Trump
Confirmations



Subpoena for Mueller Report and
Documents Approved by House
Judiciary Committee



House Intelligence
Committee Seeks
Documents From Trump's
Inaugural

In Rare S
Leader S

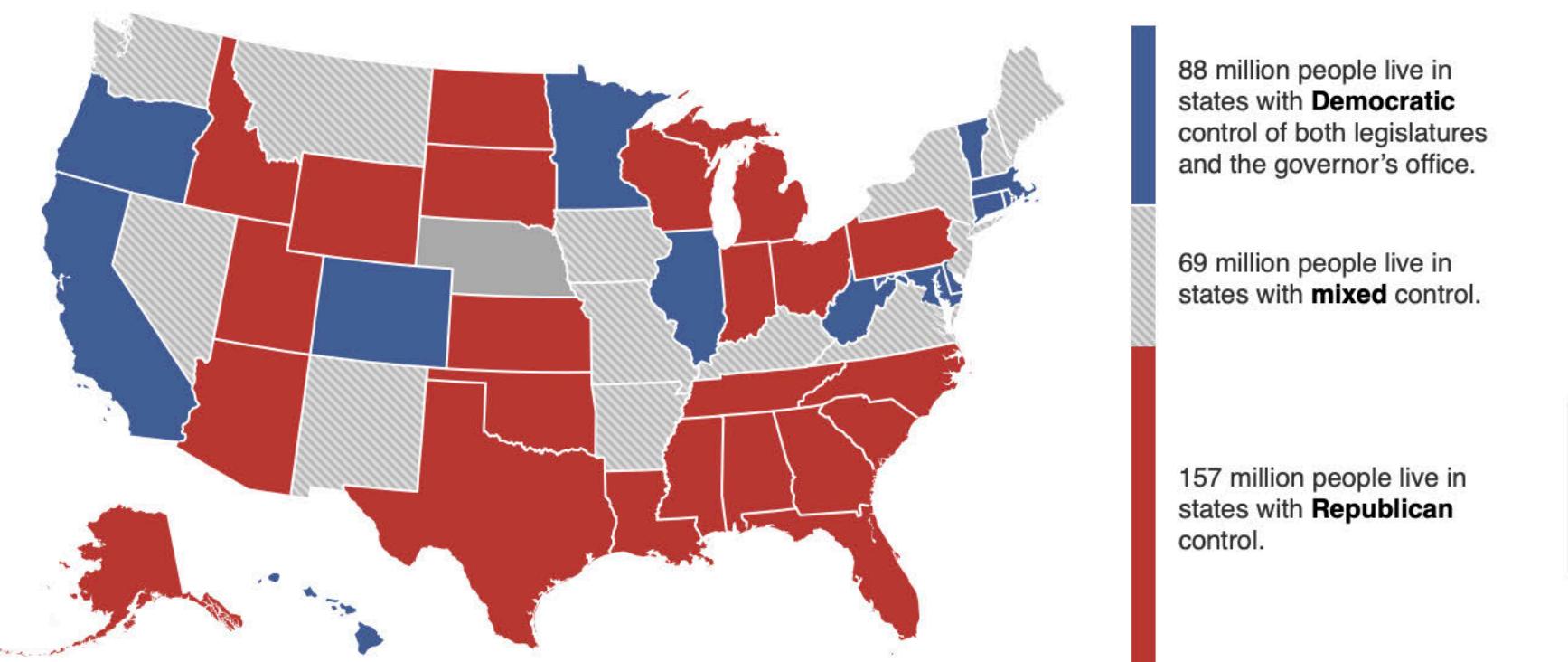
POLITICS | ONE-PARTY RULE

SHARE

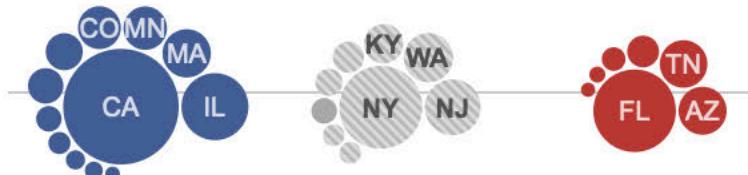
Taking the Battle to the States

By HAEYOUN PARK, JEREMY ASHKENAS and MIKE BOSTOCK JAN. 11, 2014

Republicans or Democrats have single-party control of both the legislature and the governor's office in 36 states, the most in six decades. Lawmakers in these states have been seeking to reshape government policy in recent years, from legalizing same-sex marriage to restricting labor unions. Some of these laws were passed after the rapid rise of single-party control in 2010; others have been in place for years. Below is a look at where states stand on some key issues.



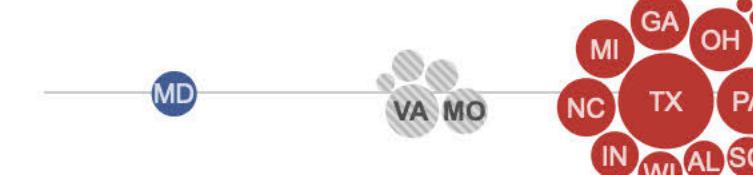
Did not pass new restrictions in 2013



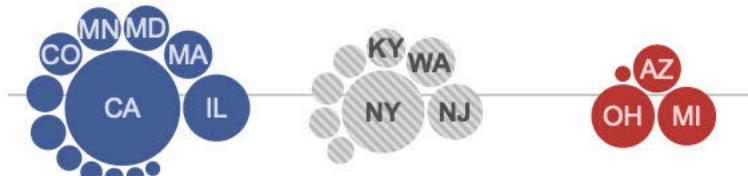
Abortion

Twenty-two states — all but six controlled by Republicans — enacted 70 abortion restrictions in 2013, according to the Guttmacher Institute, a research group. Laws ranged from bans on abortions 20 weeks after fertilization to limitations on insurance coverage of abortions.

Passed new restrictions in 2013



Expanded Medicaid



Medicaid

A 2012 Supreme Court decision allowed states to decide whether to expand Medicaid to more low-income adults under the Affordable Care Act. All 13 Democratic states have expanded the program. Most Republican states did not. Pennsylvania, Indiana and Tennessee have not expanded it but may do so.

Have not expanded at this time

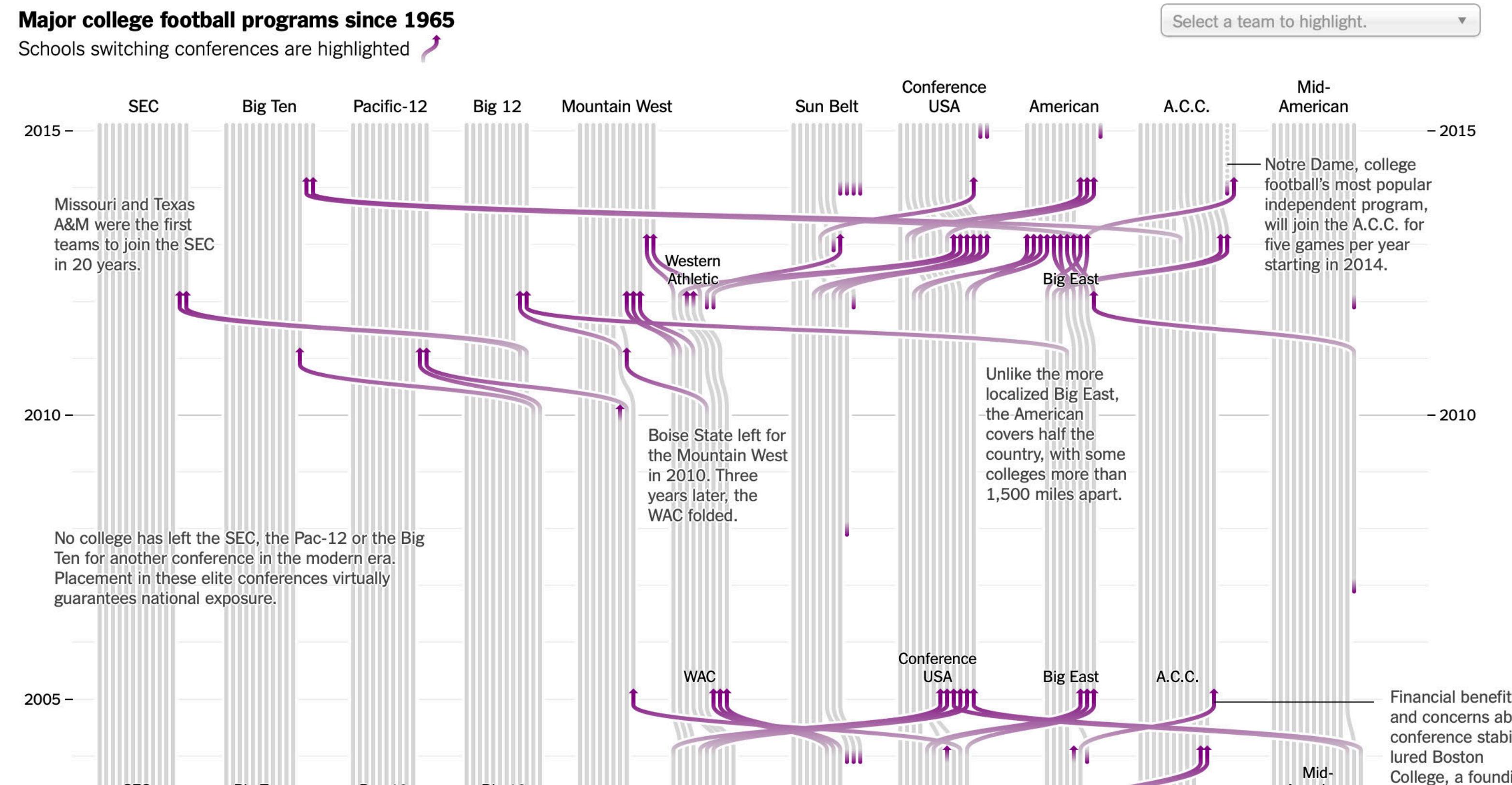


Published: November 30, 2013

Tracing the History of N.C.A.A. Conferences

By MIKE BOSTOCK, SHAN CARTER and KEVIN QUEALY

A frenzy of realignment has transformed college athletics: about one in four major football programs has switched conferences since 2010. The effects are only starting to play out as programs build new infrastructure to televise and market their programs, especially in up-and-coming conferences. As conferences have become essential to stay competitive, the number of unaffiliated major schools [redacted] has declined sharply. Here, how major college football programs have shifted since 1965.





OPENVIS CONFERENCE

Debriefing on infographics

We want information graphics to ...

Tell a complete story where the purpose is to inform, entertain or persuade the audience. It should:

simple, focused messages

new, surprising information

credible data sources

visually coherent, integrated

use comparisons for context, meaning

principles of information design, organized

Reworking messaging to persuade the CEO

Group work

Our next assignment is to **persuade the CEO to invest further in analytics**, and to persuade them, we are to use our data analytics project as evidence that data analytics adds value.

Group together, get feedback on the messaging you used in your infographic.

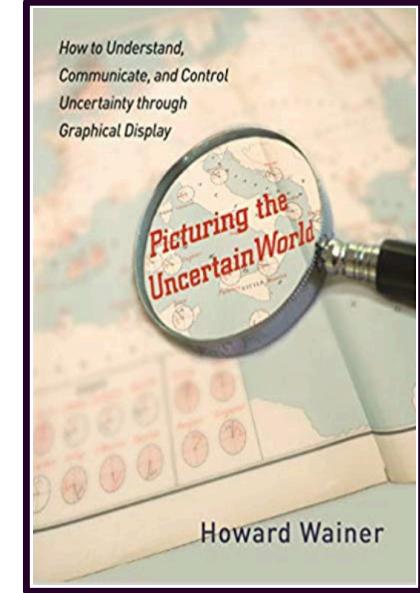
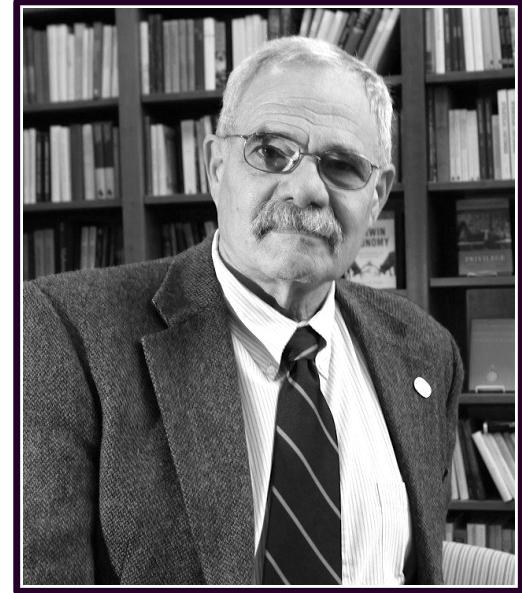
The peer providing feedback should **independently review the infographic**, try to **identify the goal and purpose of the messaging**, and with the author discuss how that messaging may be effective to persuade the CEO, and how it may be revised to better support such an argument.

Considering uncertainty

Picturing the Uncertain World

Wainer

He is an American statistician, past principal research scientist at the Educational Testing Service, adjunct professor of statistics at the Wharton School of the University of Pennsylvania, and author, known for his contributions in the fields of statistics, psychometrics, and statistical graphics.



The most dangerous equation

De Moivre's equation:

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} \quad \therefore \quad \sigma_{\bar{x}} < \sigma$$

σ the measure of the variability of a population (its standard deviation).

$\sigma_{\bar{x}}$ the variation of averages of subsets of the population.

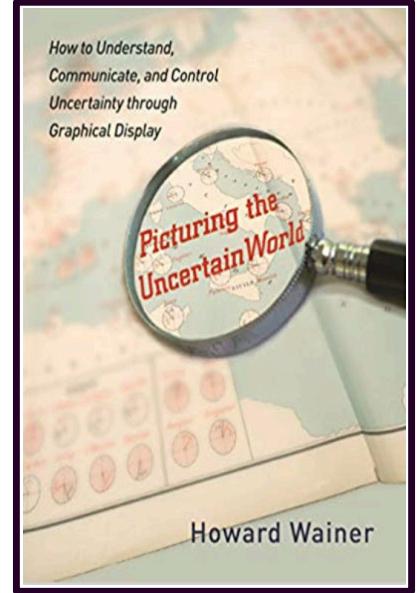
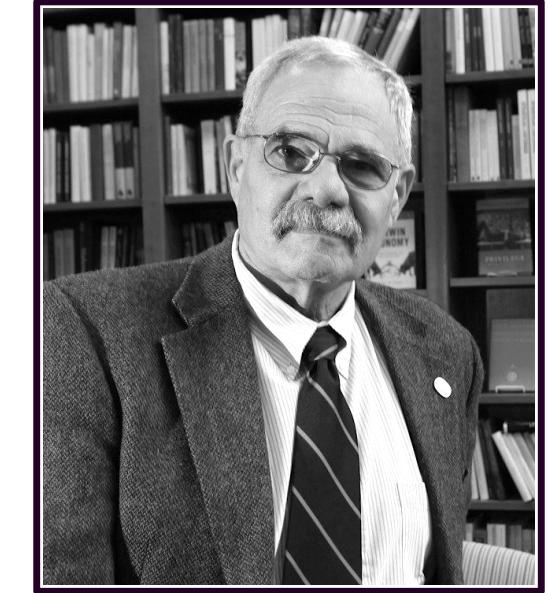
n the number of observations in each subset

Why so dangerous?

Extreme length of time during which ignorance of it has caused confusion

Wide breadth of areas that have been misled

Seriousness of the consequences that ignorance has caused



Picturing the Uncertain World

Wainer

He is an American statistician, past principal research scientist at the Educational Testing Service, adjunct professor of statistics at the Wharton School of the University of Pennsylvania, and author, known for his contributions in the fields of statistics, psychometrics, and statistical graphics.

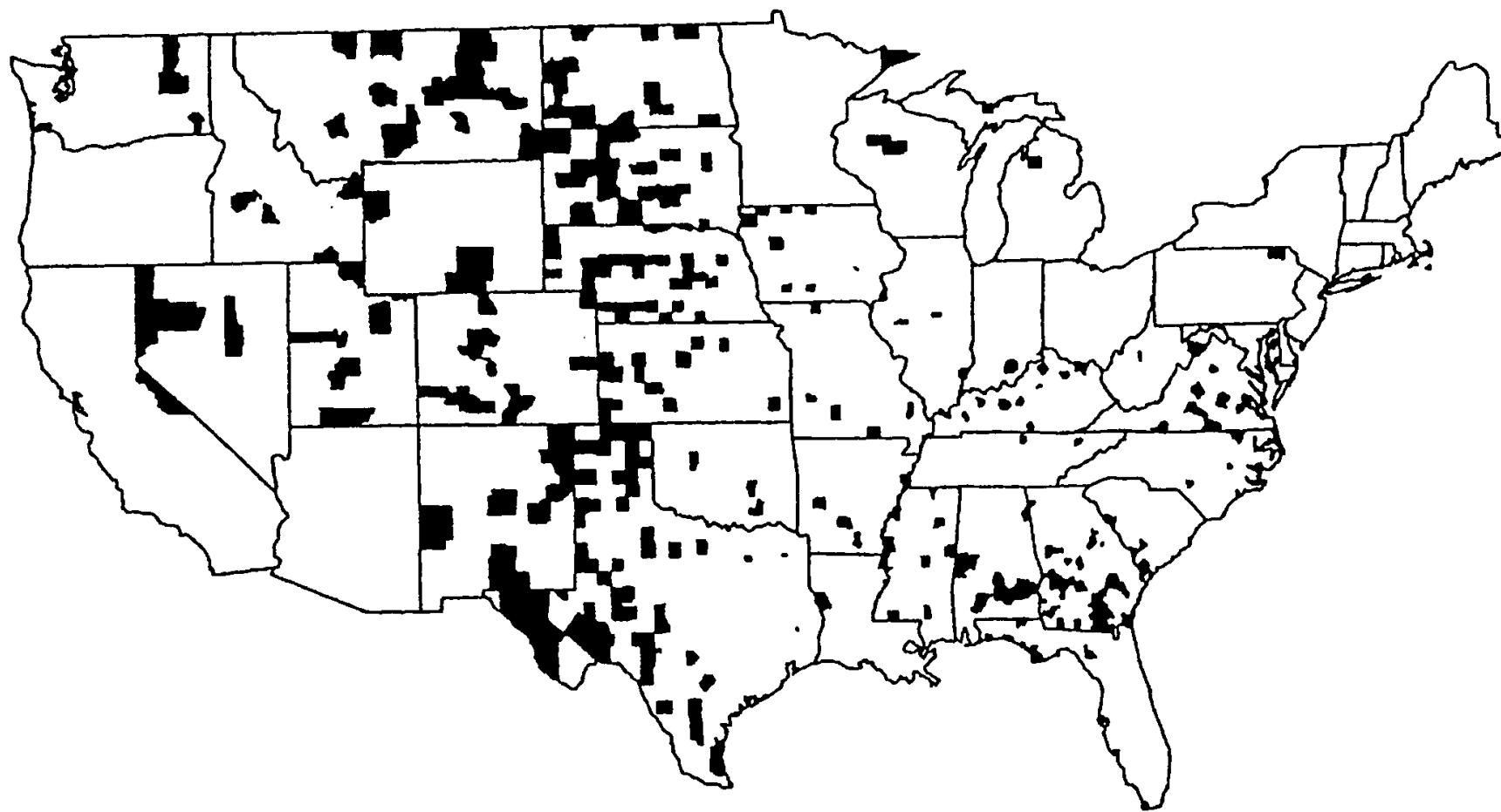


Figure 1.1.
Lowest kidney cancer death rates. The counties of the United States with the lowest 10% age-standardized death rates for cancer of kidney/urethra for U.S. males, 1980–1989 (from Gelman and Nolan, 2002, p. 15, reprinted with permission).

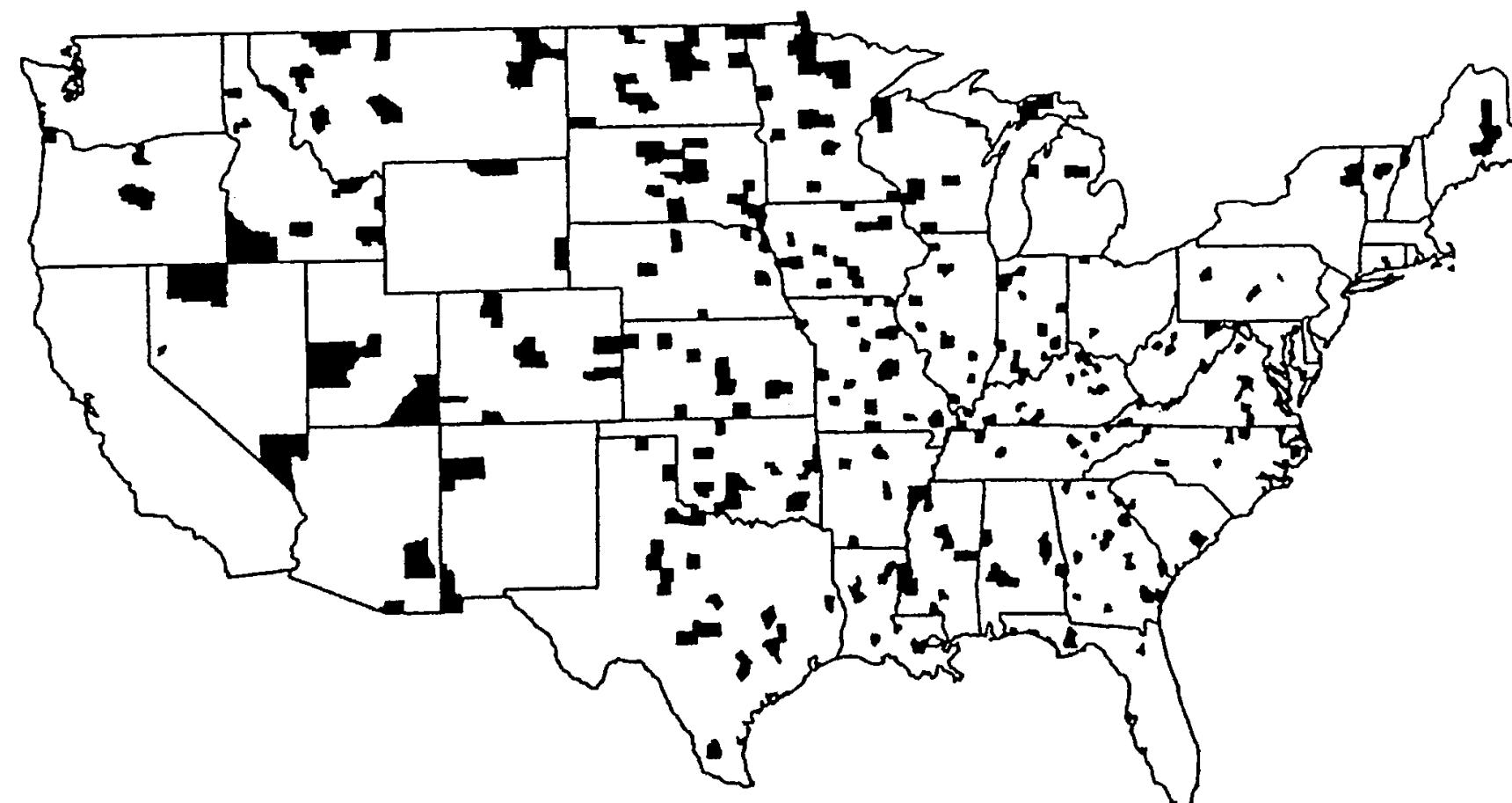
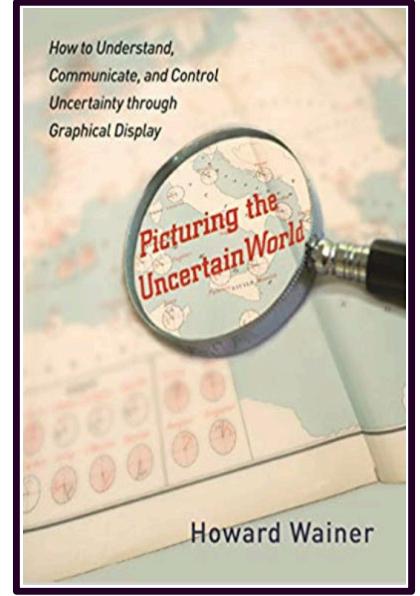
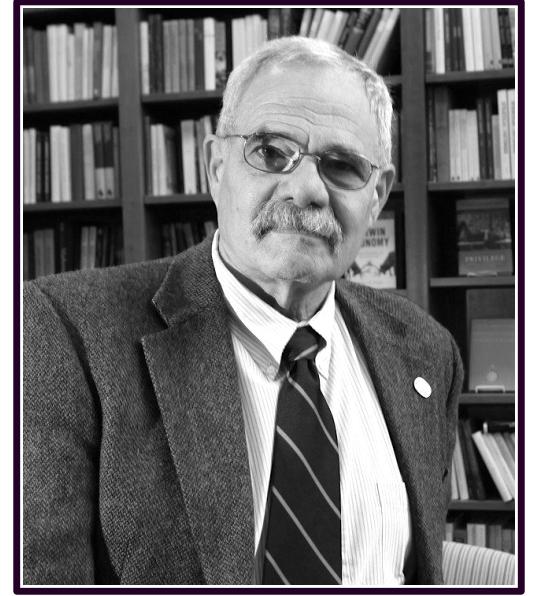


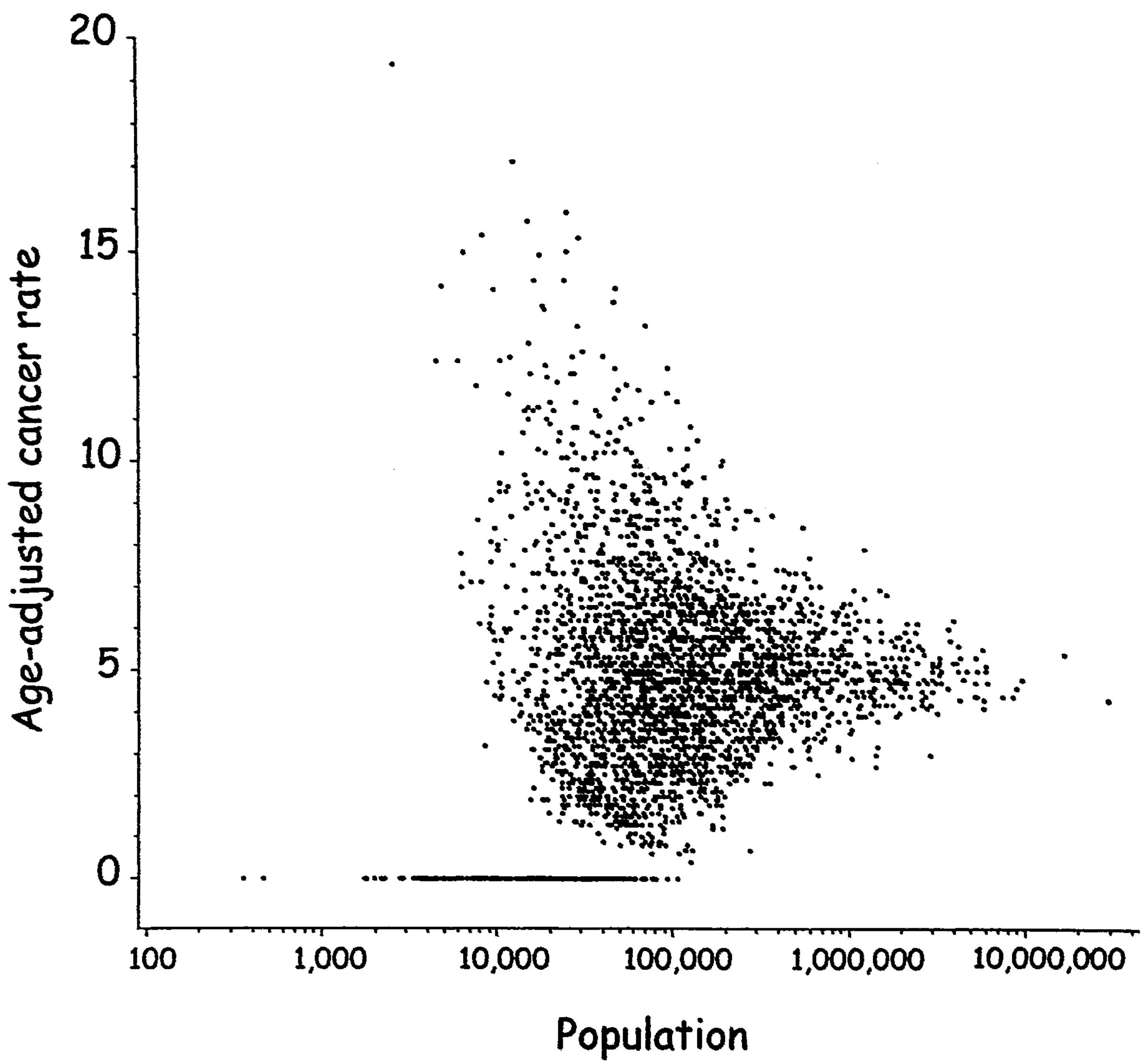
Figure 1.2.
Highest kidney cancer death rates. The counties of the United States with the highest 10% age-standardized death rates for cancer of kidney/urethra for U.S. males, 1980–1989 (from Gelman and Nolan, 2002, p. 14, reprinted with permission).



Picturing the Uncertain World

Wainer

He is an American statistician, past principal research scientist at the Educational Testing Service, adjunct professor of statistics at the Wharton School of the University of Pennsylvania, and author, known for his contributions in the fields of statistics, psychometrics, and statistical graphics.



Communicating Uncertainty: Fulfilling the Duty to Inform

Fischhoff

He is a Professor in Department Engineering and Public Policy and Institute for Politics and Strategy at Carnegie Mellon University. A graduate of the Detroit Public Schools, he holds a BS in mathematics and psychology from Wayne State University and an MA and PhD in psychology from the Hebrew University of Jerusalem.



Good decisions rely on knowledge of uncertainty

Scientists are often **hesitant to share their uncertainty** with decisionmakers who need to know it. With an **understanding of the reasons for their reluctance**, decisionmakers can create the conditions needed to facilitate better communication.

Failure to express uncertainty has negative value

Communicating knowledge can worsen results if it induces unwarranted confidence or is so hesitant that other, overstated claims push it aside.

Quantifying uncertainties aid verbal expression

Concern: people will misinterpret quantities of uncertainty, inferring more precision than intended.
Response: Most people like getting quantitative information on uncertainty, from them can get the main message, and **without them are more likely to misinterpret verbal expressions of uncertainty.**

Posing clear questions guide understanding

Concern: people cannot use probabilities. **Response:** laypeople can provide high-quality probability judgments, if they are asked clear questions and given the chance to reflect on them.

Communicating uncertainty protects credibility

Concern: credible intervals may be used unfairly in performance evaluations. **Response:** probability judgments give us more accuracy about the information; i.e., won't be too confident or lack enough confidence.

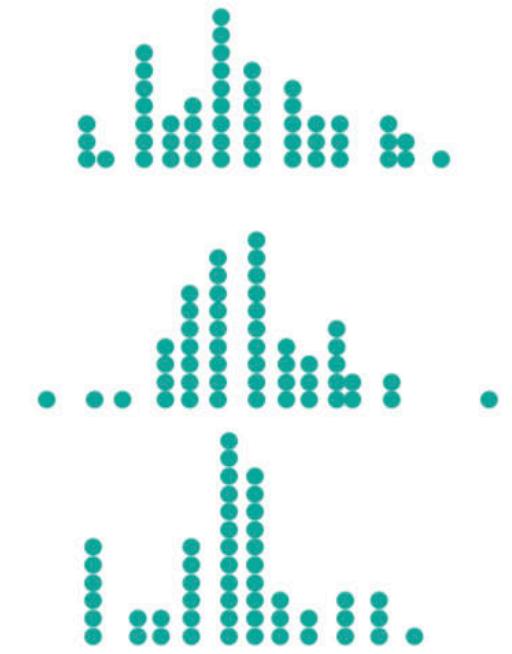


When (ish) Is My Bus?

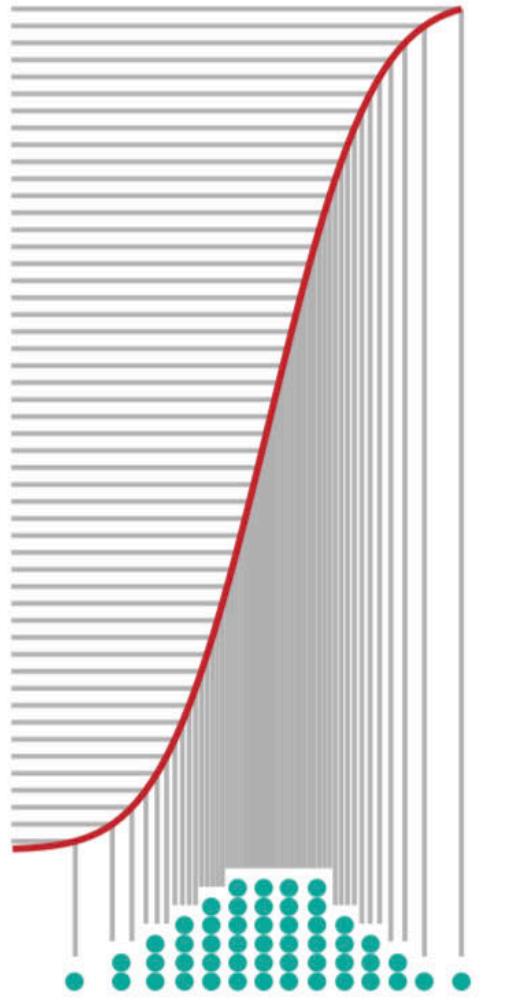
Kay

He is an Assistant Professor of Information at UMSI, and works in human-computer interaction and information visualization.

To generate a discrete plot of this distribution, we could try taking **random draws** from it. However, **this approach is noisy**: it may be very different from one instance to the next.



Instead, we use the **quantile function (inverse CDF)** of the distribution to generate “draws” from evenly-spaced quantiles.



We plot the quantile “draws” using a Wilkinsonian dotplot, yielding what we call a **quantile dotplot**: a consistent discrete representation of a probability distribution.

By using quantiles we facilitate interval estimation from frequencies: e.g., knowing there are 50 dots here, if we are willing to miss our bus **3/50** times, we can count **3 dots** from the left to get a one-sided **94% (1 - 3/50) prediction interval** corresponding to that risk tolerance.



Let's look ahead

For Next Week, Module 11:

Agenda next week

The minimum

Preparation for presentations **AND** peer review

Doumont, Jean-Luc. *Effective Oral Presentations, in Trees, Maps, and Theorems*. Principiæ, 2009. Print.

Consider his process of preparing an oral presentation and how oral presentation shares complements written and visual communication.

Tufte, Edward R. *The Cognitive Style of PowerPoint: Pitching Out Corrupts Within*, in *Beautiful Evidence*. Graphics Press, 2006. Print.

Think about the issues he raises of information presented in the form of projected slides.

Duarte, Nancy. *There's always room to improve*, in Chp. 8, *Resonate: Present Visual Stories That Transform Audiences*. Wiley, 2010. Print.

Consider how she organizes and designs the visual parts of a presentation, and its relation to oral delivery.

Schwabish, Jonathan. “Better Presentations: a Guide for Scholars, Researchers, and Wonks.” (2016): 1-200. Print.

Study for presentation best practices.

Online workshopping

Applying Schwabisch's questions

In *Better Presentations*, Schwabisch considers several questions to be answered when preparing for a presentation. How are you answering those for your upcoming deliverable?

Reworking past deliverables

In online discussion, continue getting feedback from peers on how to improve messaging from past deliverables, to better demonstrate the value of your analytics project.

**See you
next week!**

