the truthful truthful data, charts, and maps for communication

alberto cairo

"Cairo sets the standard for how data should be understood, analyzed, and presented. The Truthful Art is both a manifesto and a manual for how to use data to accurately, clearly, engagingly, imaginatively, beautifully, and reliably inform the public."

Jeff Jarvis, professor, CUNY Graduate School of Journalism, and author of Geeks Bearing Gifts: Imagining New Futures for News

Praise for The Truthful Art

- "Alberto Cairo is widely acknowledged as journalism's preeminent visualization wiz. He is also journalism's preeminent data scholar. As newsrooms rush to embrace data journalism as a new tool—and toy—Cairo sets the standard for how data should be understood, analyzed, and presented. The Truthful Art is both a manifesto and a manual for how to use data to accurately, clearly, engagingly, imaginatively, beautifully, and reliably inform the public."
 - —Jeff Jarvis, professor at CUNY Graduate School of Journalism and author of Geeks Bearing Gifts: Imagining New Futures for News
- "A feast for both the eyes and mind, Alberto Cairo's *The Truthful Art* deftly explores the science—and art—of data visualization. The book is a must-read for scientists, educators, journalists, and just about anyone who cares about how to communicate effectively in the information age."
 - Michael E. Mann, Distinguished Professor, Penn State University and author of The Hockey Stick and the Climate Wars
- "Alberto Cairo is a great educator and an engaging storyteller. In *The Truthful Art* he takes us on a rich, informed, and well-visualized journey that depicts the process by which one scrutinizes data and represents information. The book synthesizes a lot of knowledge and carefully explains how to create effective visualizations with a focus on statistical principles. *The Truthful Art* will be incredibly useful to both practitioners and students, especially within the arts and humanities, such as those involved in data journalism and information design."
 - —Isabel Meirelles, professor at OCAD University (Canada) and author of Design for Information
- "As soon as I started immersing myself in *The Truthful Art*, I was horrified (and somewhat ashamed) to realize how much I didn't know about data visualization. I've spent most of my career pursuing a more illustrative way to present data, but Alberto Cairo's clarifying prose superbly explained the finer points of data viz. Since Alberto warns us that "[data is] always noisy, dirty, and uncertain," everyone in this business had better read his book to find out how to properly construct visualizations that not only tell the truth, but also allow us to interact meaningfully with them."
 - -Nigel Holmes, founder of Explanation Graphics

Truthful Art, The: Data, Charts, and Maps for Communication

Table of Contents

Cover

Title Page

Copyright Page

Acknowledgments

About the Author

Contents

Preface

Introduction

PART I: foundations

1 What We Talk About When We Talk About Visualization

To Learn More

2 The Five Qualities of Great Visualizations

The Hockey Stick Chart

Truthful

Functional

Beautiful

Insightful

Enlightening

To Learn More

PART II: truthful

3 The Truth Continuum

Dubious Models



Table of Contents

The Mind, That Clumsy Modeler

Why Are We So Often Mistaken?

Mind Bug 1: Patternicity

Mind Bug 2: Storytelling

Mind Bug 3: Confirmation

Truth Is Neither Absolute, Nor Relative

The Skills of the Educated Person

To Learn More

4 Of Conjectures and Uncertainty

The Scientific Stance

From Curiosity to Conjectures

Hypothesizing

An Aside on Variables

On Studies

Doing Experiments

About Uncertainty

To Learn More

PART III: functional

5 Basic Principles of Visualization

Visually Encoding Data

Choosing Graphic Forms

A Grain of Salt

Practical Tips About those Tricky Scales

Organizing the Display

Put Your Work to the Test

To Learn More

6 Exploring Data with Simple Charts

The Norm and the Exceptions

The Mode, the Median, and the Mean

Weighting Means

Range



Table of Contents

Some Fun with Ranges

To Learn More

7 Visualizing Distributions

The Variance and the Standard Deviation

Standard Deviation and Standard Scores

Presenting Stories with Frequency Charts

How Standardized Scores Mislead Us

Peculiarities of the Normal Distribution

Percentiles, Quartiles, and the Box Plot

Manipulating Data

Frequency Over Time

To Learn More

8 Revealing Change

Trend, Seasonality, and Noise

Decomposing a Time Series

Visualizing Indexes

From Ratios to Logs

How Time Series Charts Mislead

Communicating Change

To Learn More

9 Seeing Relationships

From Association to Correlation

Smoothers

Matrices and Parallel Coordinate Plots

Correlation for Communication

Regression

From Correlation to Causation

Data Transformation

To Learn More

10 Mapping Data

Projection



Table of Contents

Data on Maps

Point Data Maps

Line Maps

The Basics of Choropleth Maps

Classifying Data

Using Choropleth Maps

Other Kinds of Data Maps

To Learn More

11 Uncertainty and Significance

Back to Distributions

The Standard Error

Building Confidence Inter vals

Disclosing Uncertainty

The Best A dvice Youll Ever Get: Ask

How Has Stuff Been Measured?

Dispatches from the Data Jungle

Significance, Size, and Power

To Learn More

PART IV: practice

12 On Creativity and Innovation

The Popularizers

News Applications

Those Enchanting Europeans

Making Science Visual

Culture Data

The Artistic Fringes

Epilogue

Index

