

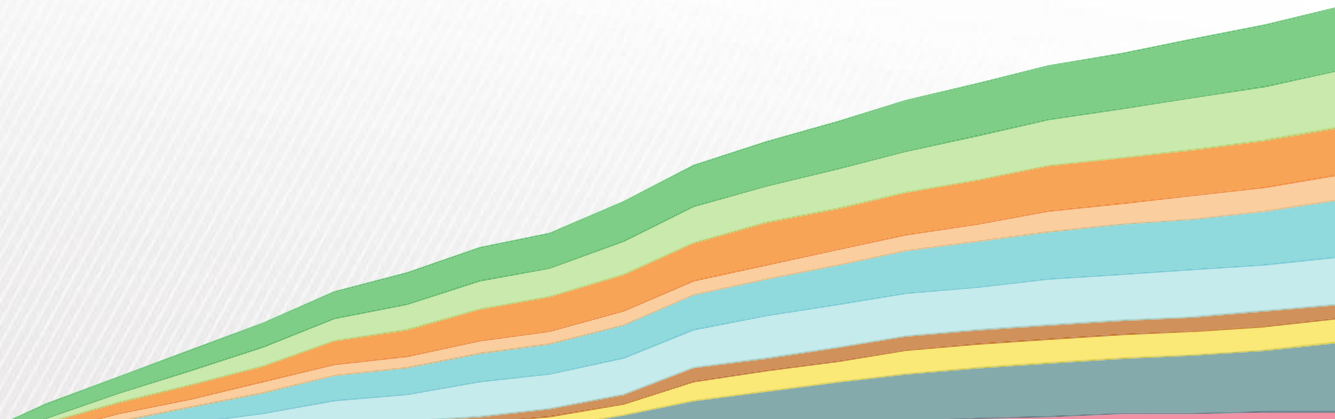
Data Visualisation: Big Data's Best Friend

Andy Cotgreave ([@acotgreave](#))
Visual Analytics Trainer,
Tableau

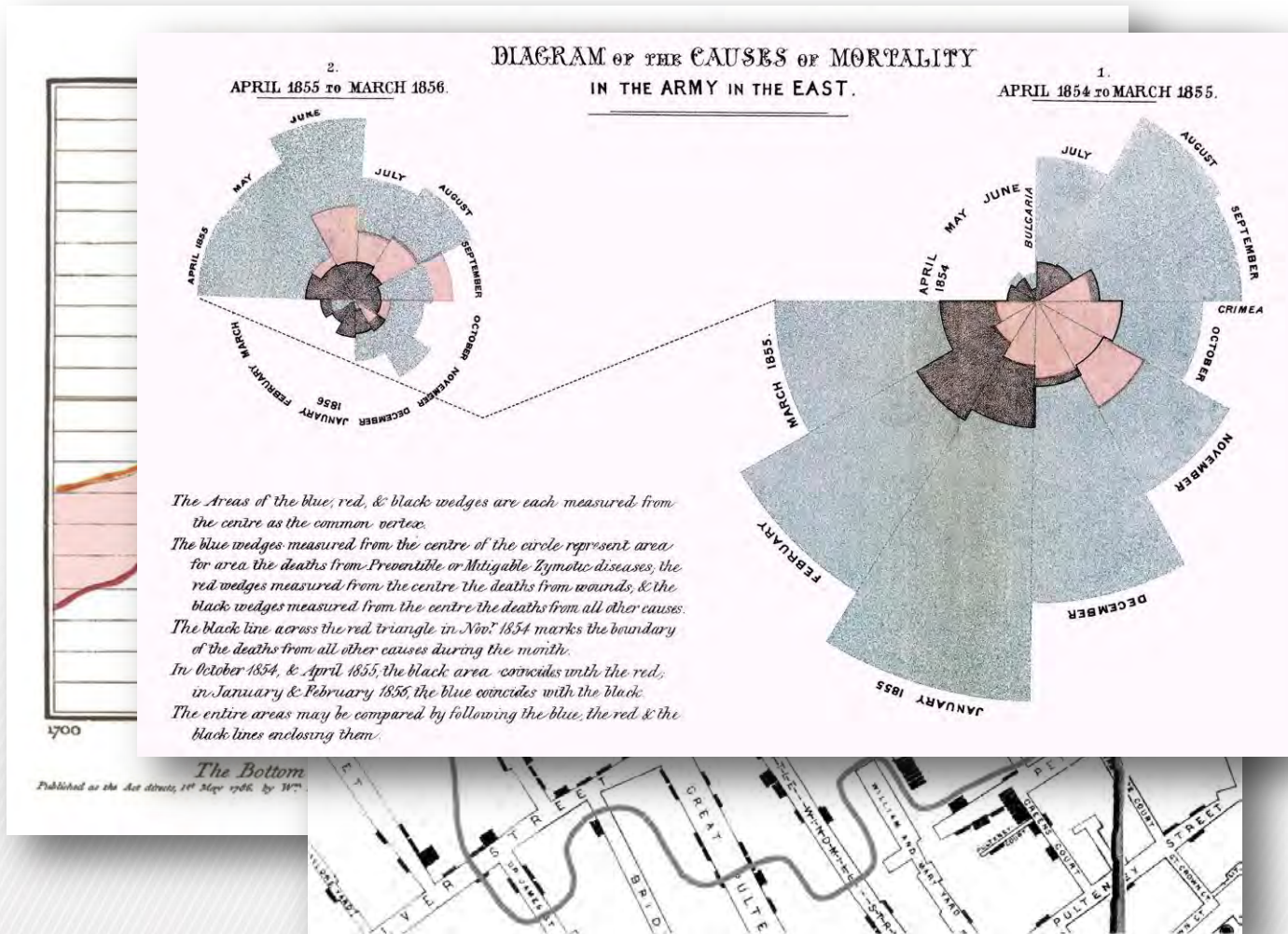


Our agenda

- History of data viz
- Why do data visualisation
- The Human Visual System
- Case study
 - Best practices in data visualisation
- Q+A



Data visualisation is not new.



Consider these numbers...

x	y	x	y	x	y	x	y
10	8.0	10					
8	7.0	8					
13	7.6	13					
9	8.8	9					
11	8.3	11					
14	10.0	14					
6	7.2	6					
4	4.3	4					
12	10.8	12					
7	4.8	7					
5	5.7	5					

Model formula: $qu*(x + intercept)$

Number of modeled observations: 11

Number of filtered observations: 0

Model degrees of freedom: 2

Residual degrees of freedom (DF): 9

SSE (sum squared error): 13.7627

MSE (mean squared error): 1.52919

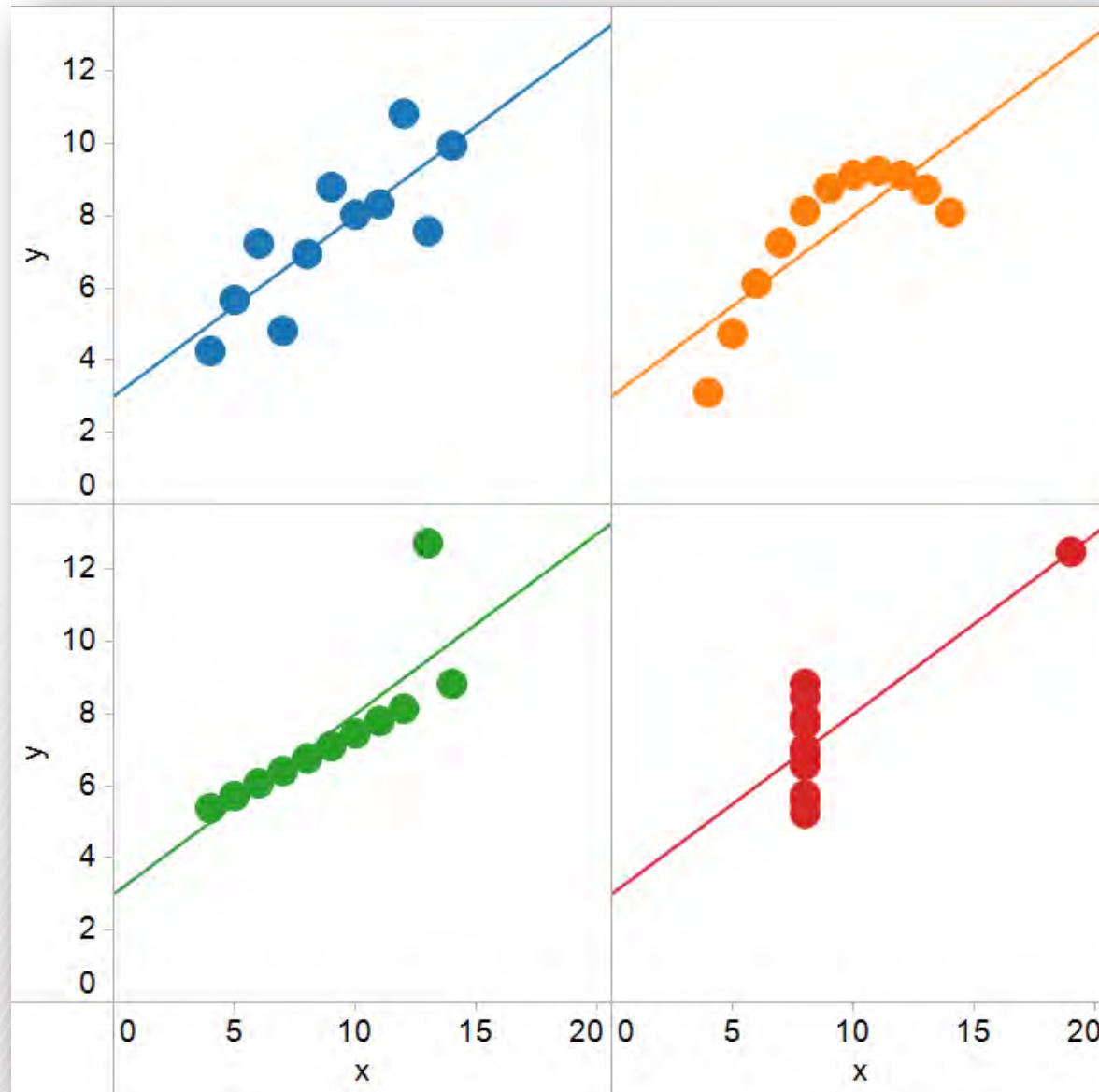
R-Squared: 0.666542

Standard error: 1.2366

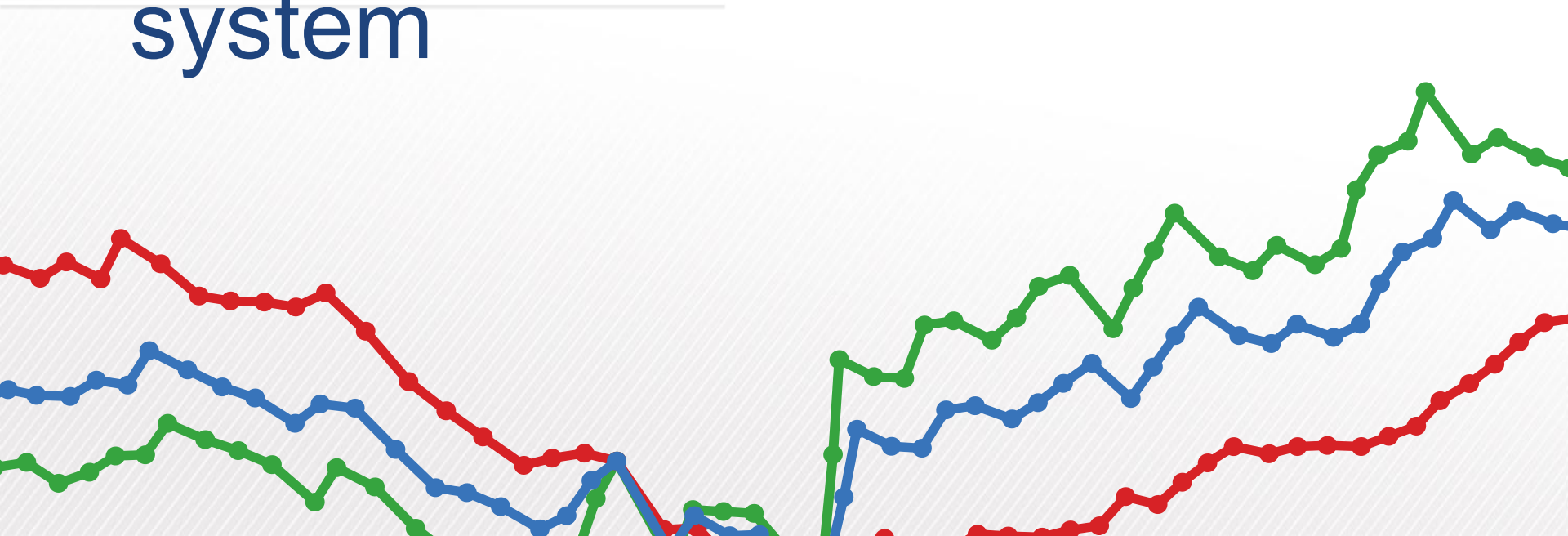
p-value (significance): 0.0021696

$$y=0.5x + 3$$

Consider these numbers...



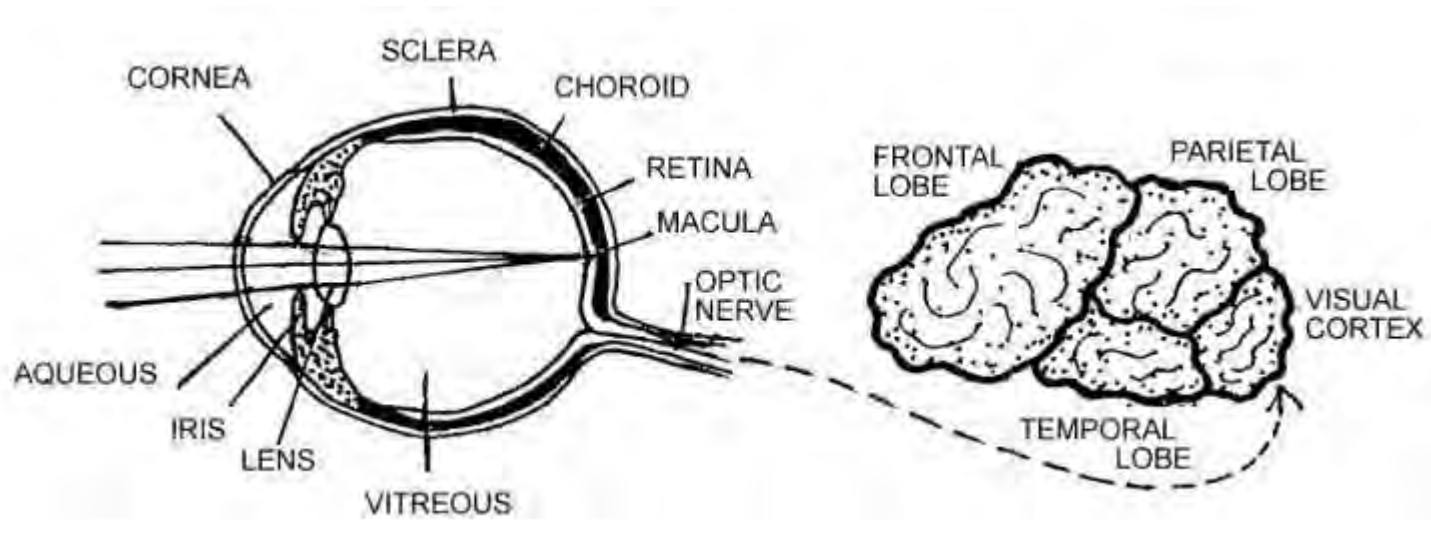
The human visual system



The human visual system

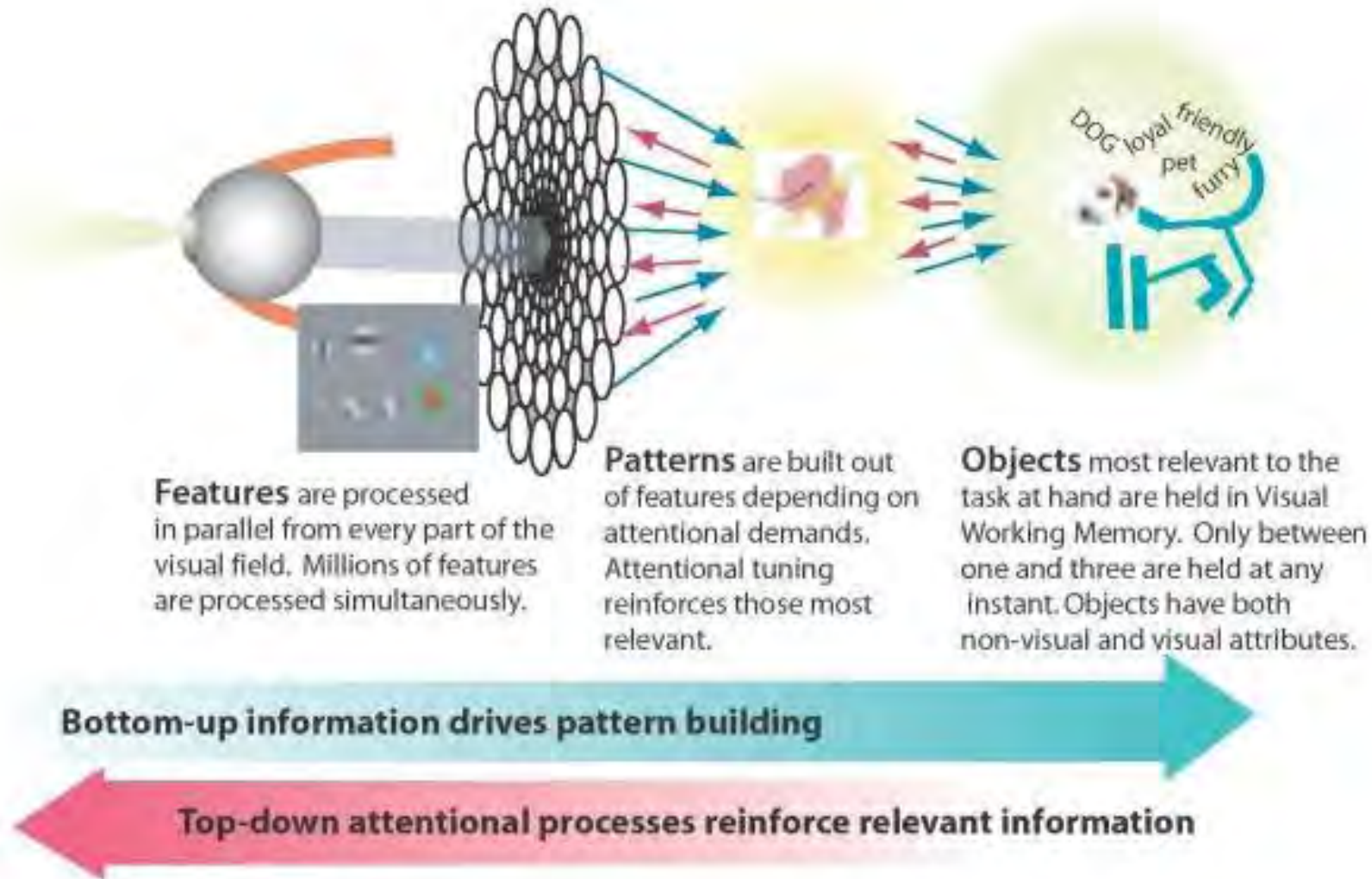
Eye

Brain



[From the Texas School for the Blind and Visually Impaired](#)

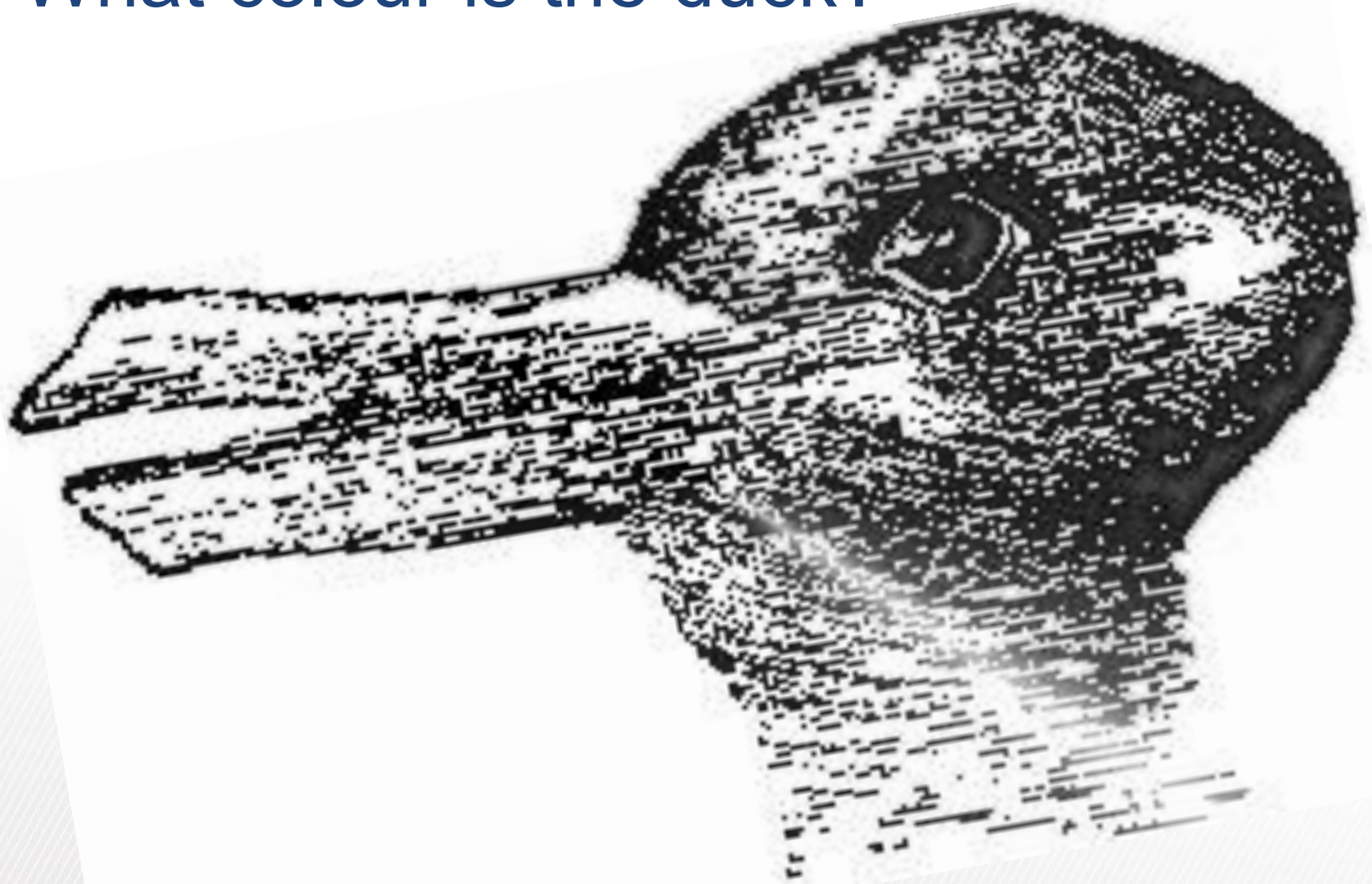
The human visual system



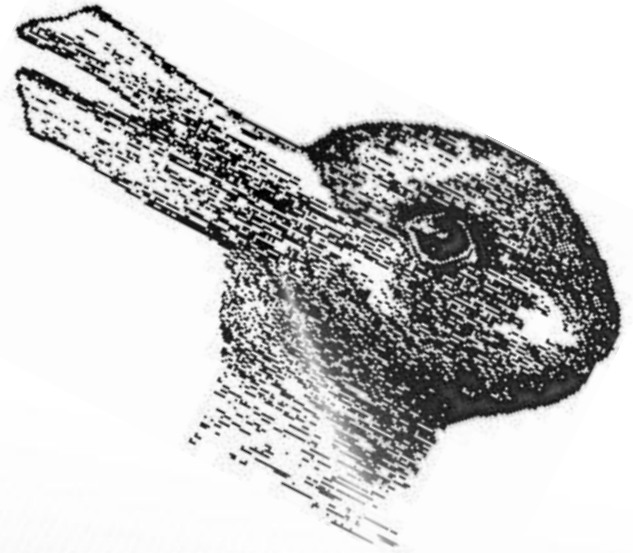
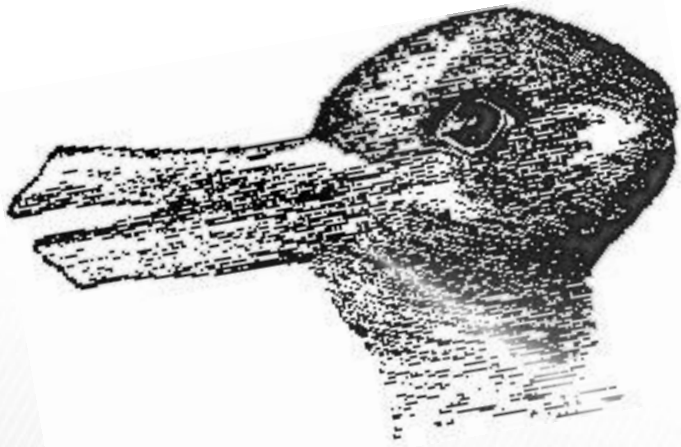
What colour is the rabbit?



What colour is the duck?



Snap!

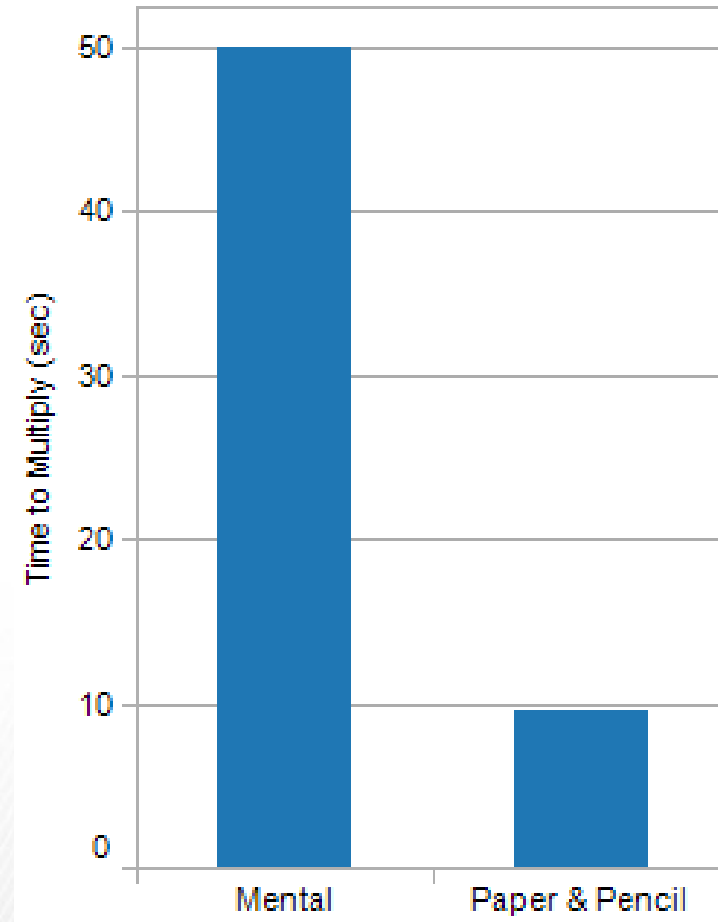


Time for some arithmetic...

$$34 \times 72$$

Humans are faster when they use the world

$$\begin{array}{r} 34 \\ \times 72 \\ \hline 68 \\ 23180 \\ \hline 2448 \end{array}$$



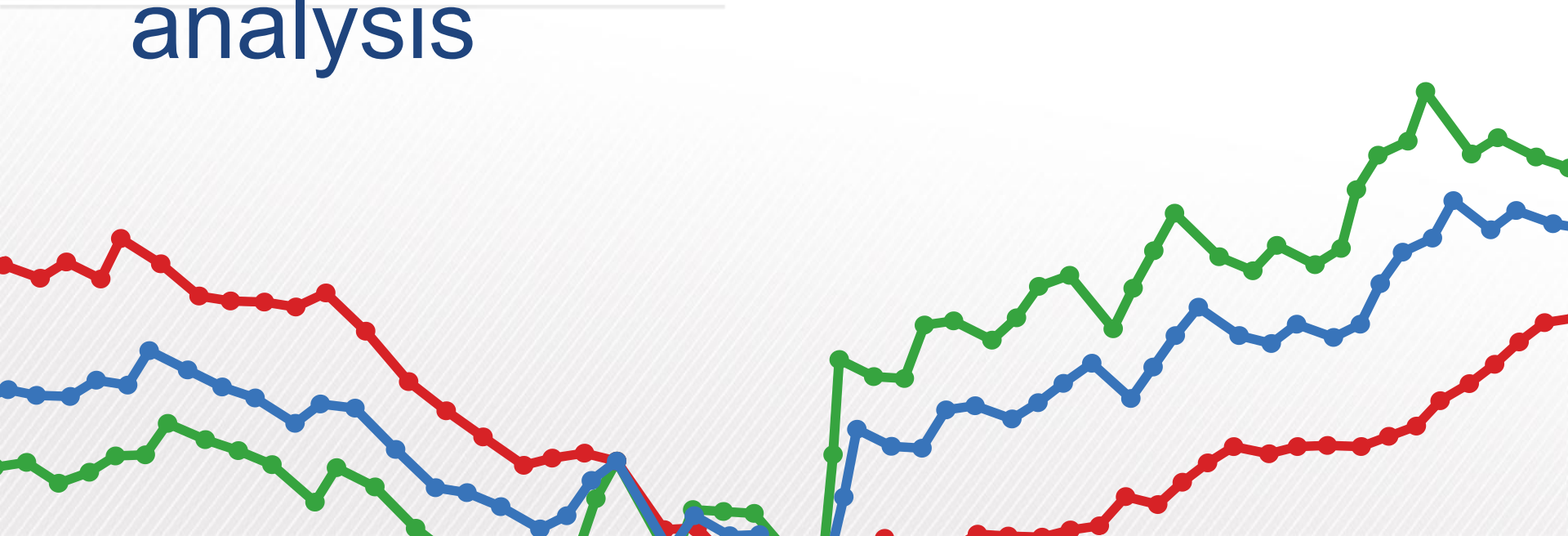
Interruptions can make people slow



Interruptions can make people slow



... apply this to visual
analysis



How many 9s are there?

4	7	7	5	5	2	7	4	7	1
4	9	2	5	7	7	2	6	1	7
1	7	6	9	3	4	7	5	1	2
5	1	6	3	3	8	4	8	6	6
6	5	6	4	9	3	8	9	1	9
3	8	1	5	2	2	3	6	3	9
4	6	4	5	6	3	7	7	9	1
9	1	3	3	6	1	3	3	1	8
8	1	1	8	7	5	8	1	7	4
3	6	9	2	8	9	3	7	5	7
4	4	4	2	8	2	2	9	2	8

How many 9s are there?

4	7	7	5	5	2	7	4	7	1
4	9	2	5	7	7	2	6	1	7
1	7	6	9	3	4	7	5	1	2
5	1	6	3	3	8	4	8	6	6
6	5	6	4	9	3	8	9	1	9
3	8	1	5	2	2	3	6	3	9
4	6	4	5	6	3	7	7	9	1
9	1	3	3	6	1	3	3	1	8
8	1	1	8	7	5	8	1	7	4
3	6	9	2	8	9	3	7	5	7
4	4	4	2	8	2	2	9	2	8

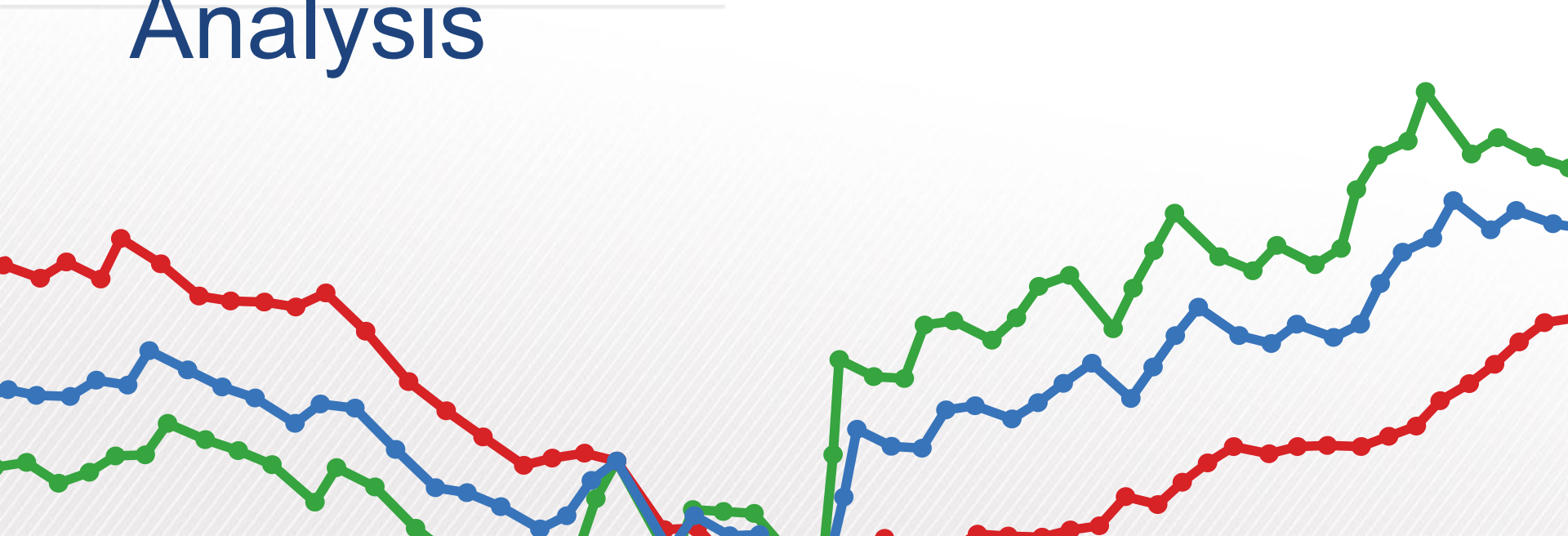
Who uses the same technique all the time?

Product T..	Product	Market							
		Central		East		South		West	
		Sales	Profit	Sales	Profit	Sales	Profit	Sales	Profit
Coffee	Amaretto	\$14,012	\$5,104	\$2,994	\$1,010			\$9,263	(\$1,224)
	Columbian	\$28,911	\$8,525	\$47,385	\$27,256	\$21,663	\$8,767	\$30,352	\$11,256
	Decaf Irish Cream	\$26,157	\$9,635	\$6,262	\$2,726	\$11,596	\$2,935	\$18,233	(\$1,307)
Espresso	Caffe Latte					\$15,443	\$3,873	\$20,456	\$7,502
	Caffe Mocha	\$35,218	\$14,642	\$16,646	(\$6,232)	\$14,166	\$5,202	\$18,874	\$4,066
	Decaf Espresso	\$24,483	\$8,859	\$7,720	\$2,411	\$15,381	\$5,930	\$30,578	\$12,302
	Regular Espresso			\$24,031	\$10,065				
Herbal Tea	Chamomile	\$36,571	\$14,435	\$2,193	\$764	\$11,183	\$3,178	\$25,631	\$8,854
	Lemon	\$21,982	\$6,253	\$27,177	\$7,902	\$14,494	\$2,593	\$32,273	\$13,121
	Mint	\$9,335	\$4,069	\$11,991	(\$2,243)			\$14,384	\$4,328
Tea	Darjeeling	\$30,284	\$10,769	\$14,094	\$6,500			\$28,773	\$11,784
	Earl Grey	\$32,883	\$10,334	\$6,507	\$3,404			\$27,382	\$10,426
	Green Tea	\$5,209	\$1,227	\$11,576	\$5,654			\$16,065	(\$7,112)

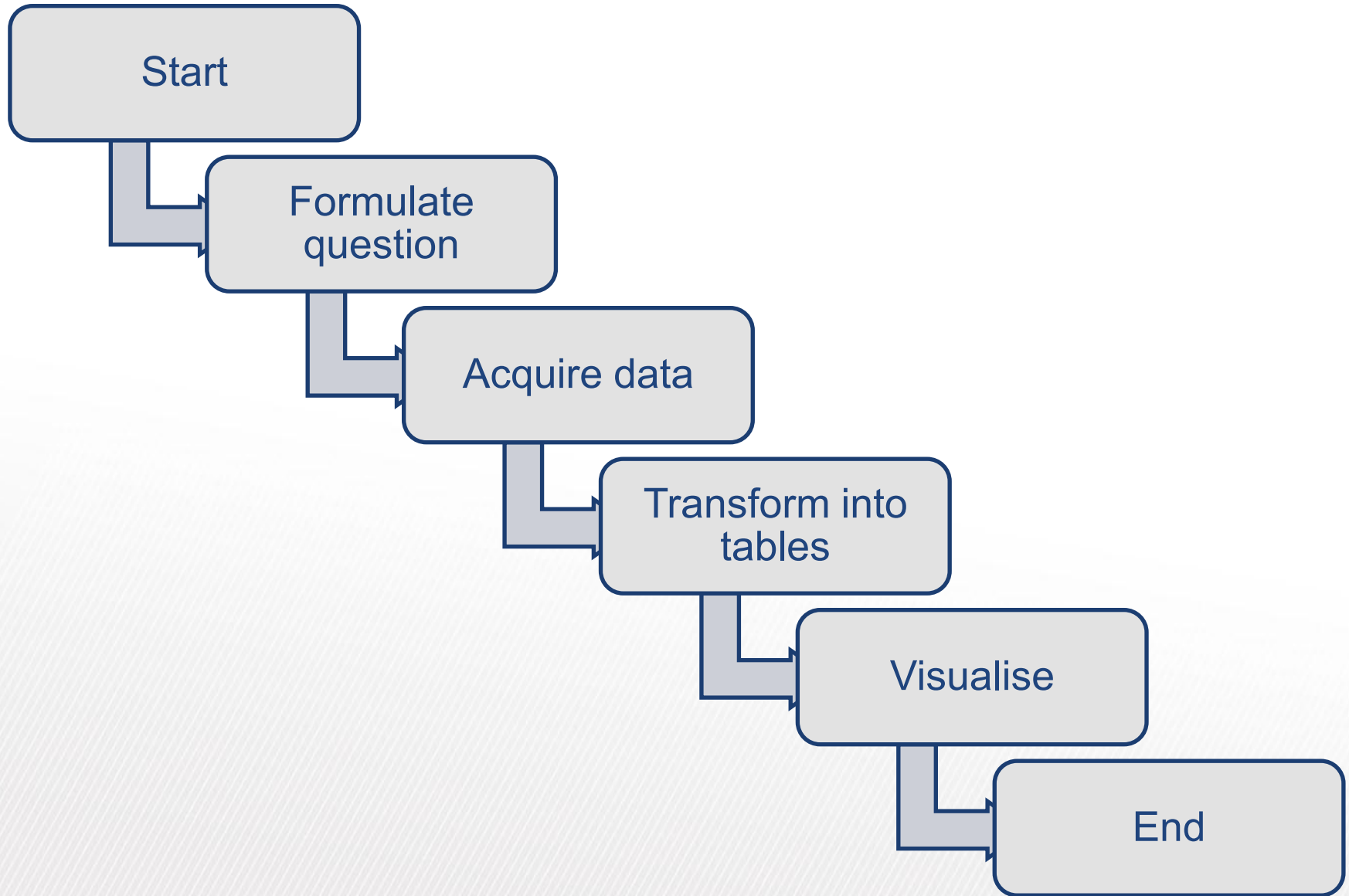
Who uses the same technique all the time?

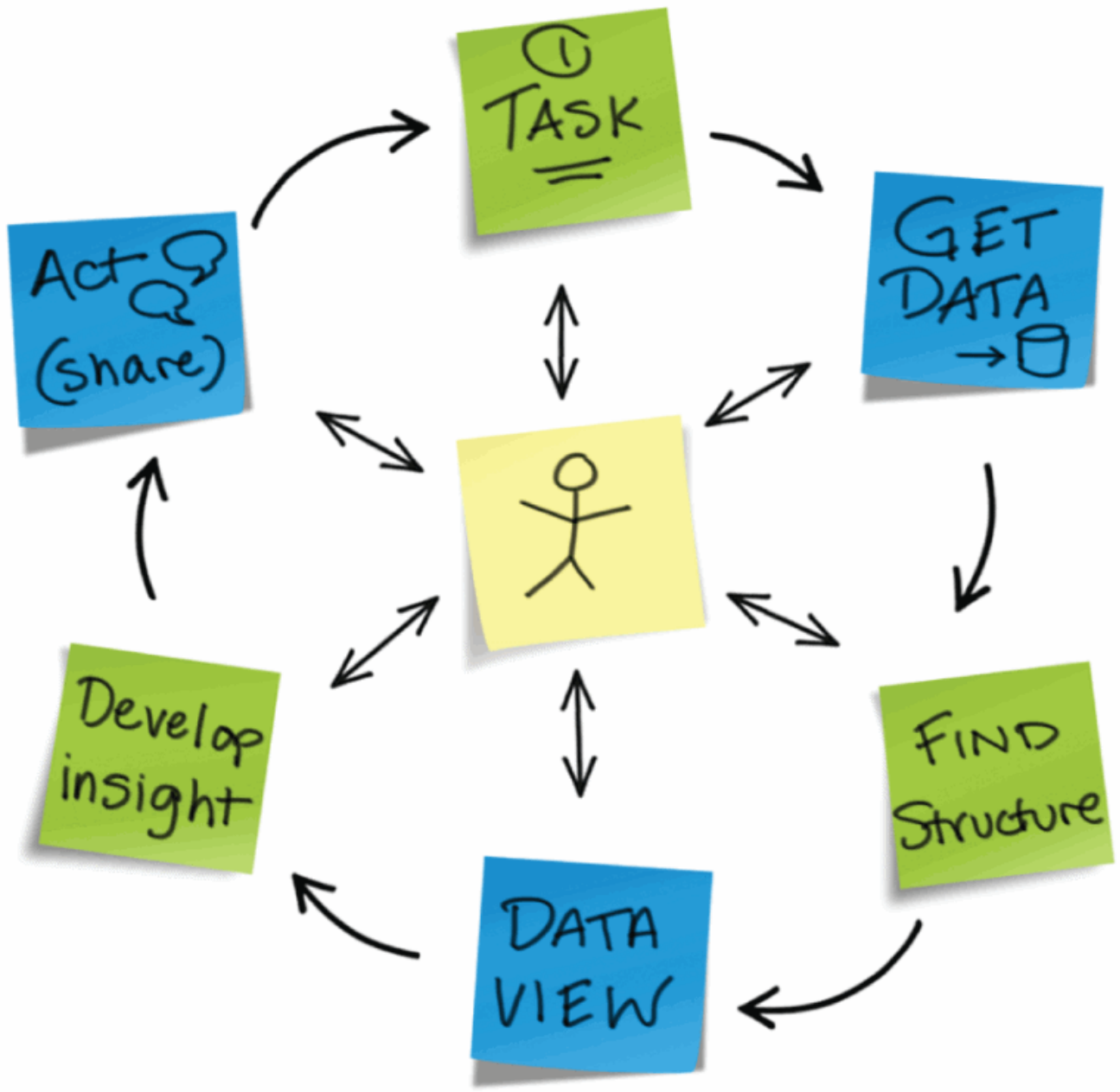


The Cycle of Visual Analysis



The traditional way





“Reverse your thinking
and start with the data”

*Jock Mackinlay,
Head of Research at
Tableau*



Demo: Bird Strikes



theguardian

News | Sport | Comment | Culture | Business | Money | Life & style

Environment > Travel and transport

Risk of bird strikes would make Thames Estuary UK's 'most dangerous airport'

Report warns that the risk of aircraft loss after being hit by birds is higher at proposed site than any other UK airport

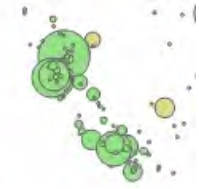
Juliette Jowit

guardian.co.uk, Thursday 26 January 2012 10.05 GMT

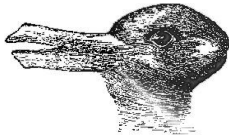
INCIDENT_DAT	AIRPORT	STATE	SPECIES	TIME	HEIGHT	SPEED	INDE	OPID	OPERATOR	ATYPE
1/1/1990	CINCINNATI/NO KY INTL	KY	GULLS				79416	DAL	DELTA AIR LINES	B-757-200
1/7/1990	UNKNOWN	AL	UNKNOWN BIRD				79417	EME	METRO EXPRESS	DHC8 DASH 8
1/8/1990	ORLANDO INTL	FL	GULLS	Day	60	150	53443	USA	US AIRWAYS	B-737-200
1/11/1990	NEW ORLEANS INTL	LA	ROCK PIGEON	Day	0	140	53703	SWA	SOUTHWEST AIRLINES	B-737-300
1/11/1990	JOHN C. TUNE ARPT	TN	WHITE-TAILED DEER	Night	0	100	64040	BUS	BUSINESS	HWKR SD-125
1/19/1990	LOUISVILLE INTL ARPT	KY	SPARROWS	Day	300	150	52859	UPS	UPS AIRLINES	DC-8
1/19/1990	UNKNOWN	CA	UNKNOWN BIRD	Night			79418	PVT	PRIVATELY OWNED	PA-32
1/19/1990	JACK BARSTOW	MI	WHITE-TAILED DEER	Dusk	0		79450	PVT	PRIVATELY OWNED	PA-28
1/20/1990	MORRISTOWN MUNI ARPT	NJ	GEESE	Day	0		79419	BUS	BUSINESS	LOCKHD 1329
1/23/1990	ST. PAUL DOWNTOWN HOL	MN	WHITE-TAILED DEER	Night	0		79451	USC	AIRNET EXPRESS	LEARJET-25
1/26/1990	KALAMAZOO/BATTLE CREEK	MI	GEESE	Dusk			79420	PVT	PRIVATELY OWNED	AA-5
1/26/1990	UNKNOWN		GEESE				79421	PVT	PRIVATELY OWNED	BE-36
2/8/1990	JOHN F KENNEDY INTL	NY	HERRING GULL				75946	BUS	BUSINESS	L-1011-500
2/8/1990	UNKNOWN	CA	UNKNOWN BIRD				79422	BUS	BUSINESS	C-208
2/9/1990	UNKNOWN		UNKNOWN BIRD				75984	UPS	UPS AIRLINES	B-757-200
2/10/1990	JOHN F KENNEDY INTL	NY	MALLARD		20	175	70238	DLH	LUFTHANSA	B-747
2/11/1990	UNKNOWN		UNKNOWN BIRD				73391	AAL	AMERICAN AIRLINES	B-767-200
2/13/1990	GREATER PITTSBURGH	PA	UNKNOWN BIRD				73486	USA	US AIRWAYS	B-737-300
2/14/1990	SACRAMENTO INTL	CA	UNKNOWN BIRD		0		73390	UAL	UNITED AIRLINES	B-737
2/19/1990	ROBT J MILLER AIR PARK	NJ	WHITE-TAILED DEER	Night	0		79452	PVT	PRIVATELY OWNED	PA-28
2/22/1990	ATLANTIC CITY INTL	NJ	GULLS	Day	2000		50287	GOV	GOVERNMENT	CV-580

<http://wildlife->

Summary



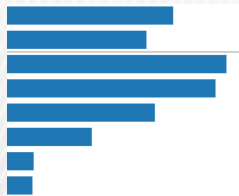
Reverse thinking and start with the data



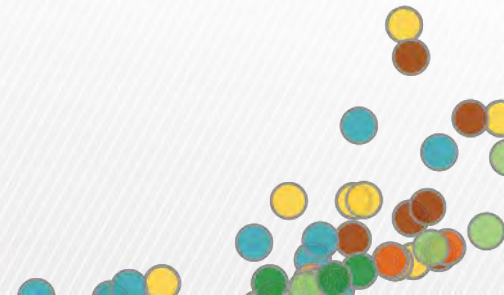
Exploit the power and avoid the pitfalls of the Human Visual system

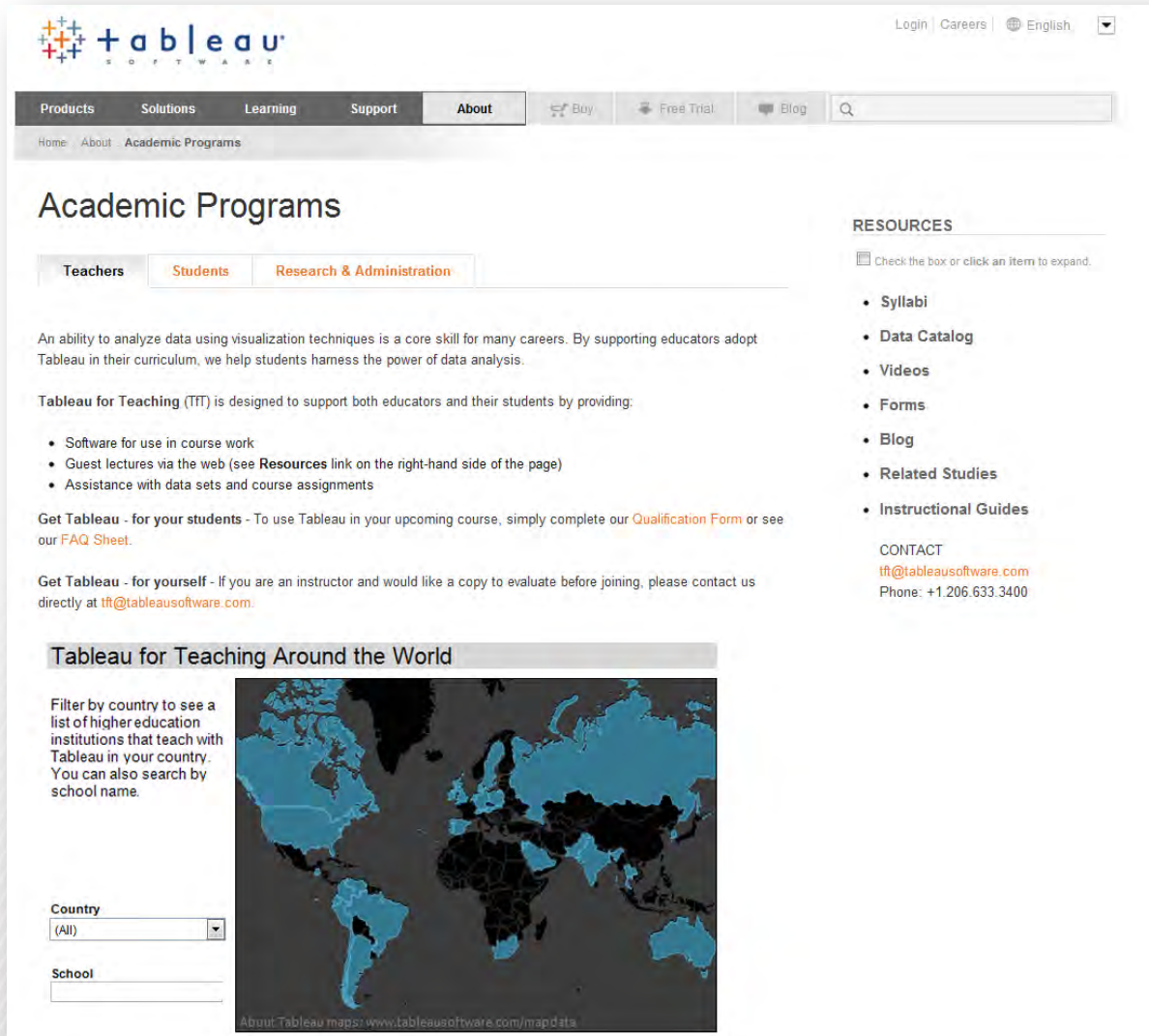


Visual Analysis is a cycle not an end point



Keep it simple





The screenshot shows the Tableau Academic Programs page. At the top is the Tableau logo and navigation links for Login, Careers, and English. Below is a main navigation bar with Products, Solutions, Learning, Support, and About. The 'About' tab is selected, leading to the 'Academic Programs' page. The page has a sub-navigation bar with Teachers, Students, and Research & Administration. The main content area includes a paragraph about the importance of data analysis, a section for 'Tableau for Teaching (TTT)' with a list of features, and two 'Get Tableau' sections for students and instructors. On the right, there is a 'RESOURCES' section with a list of links and a 'CONTACT' section with email and phone information. At the bottom, there is a 'Tableau for Teaching Around the World' section with a world map and search filters for Country and School.

Tableau Academic Programs

Teachers | **Students** | Research & Administration

An ability to analyze data using visualization techniques is a core skill for many careers. By supporting educators adopt Tableau in their curriculum, we help students harness the power of data analysis.

Tableau for Teaching (TTT) is designed to support both educators and their students by providing:

- Software for use in course work
- Guest lectures via the web (see [Resources](#) link on the right-hand side of the page)
- Assistance with data sets and course assignments

Get Tableau - for your students - To use Tableau in your upcoming course, simply complete our [Qualification Form](#) or see our [FAQ Sheet](#).

Get Tableau - for yourself - If you are an instructor and would like a copy to evaluate before joining, please contact us directly at tft@tableausoftware.com.

RESOURCES

Check the box or click an item to expand.

- Syllabi
- Data Catalog
- Videos
- Forms
- Blog
- Related Studies
- Instructional Guides

CONTACT
tft@tableausoftware.com
Phone: +1.206.633.3400

Tableau for Teaching Around the World

Filter by country to see a list of higher education institutions that teach with Tableau in your country. You can also search by school name.

Country: (All)

School:

About Tableau maps: www.tableausoftware.com/mapdata