

visualization for communication (data comm)

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a bit about me/us

a bit about me/us

the vis we know
the vis that is emerging
bottom line
why now?
trad vis fails
data comm wins
data comm breadth
research
instruction?
sources

BENJAMIN WATSON

ASSOC PROF COMP SCI NCSU
LEAD **VX LAB**, COFOUNDER **NEXUX**

UX CG VIZ MOBILE HCI VR

UX Lunch @ the Experience Innovation Studio, March 2, 12-1p

Please join [nexUX](#) and [LexisNexis](#) for our first UX monthly lunch Friday at noon at the [Experience Innovation Studio](#). This is a casual event, an opportunity to build the interdisciplinary and industry relationships that are at the foundation of great research and UX work. Lunch is provided. Please [RSVP](#)!

Help make the new year a great experience! Reception @ Experience Innovation Studio, Jan 4, 3-5p

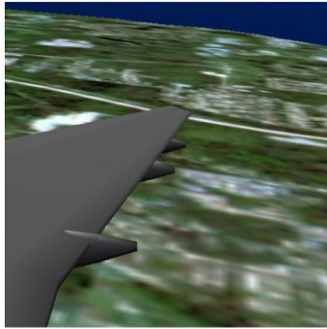
Please join [nexUX](#), the [Centennial Partnership Office](#), and [LexisNexis](#) for a reception at the [Experience Innovation Studio](#). You'll see the Studio up close, learn how it supports user experience collaboration, and meet like-minded user experience practitioners and researchers. Refreshments and stimulating conversation provided.

VISUAL EXPERIENCE LAB

BENJAMIN WATSON, LEAD
ASSOC PROF COMP SCI NCSU

VISUAL TECHNOLOGY THAT MOVES US —
HOW DIGITAL IMAGES AFFECT EMOTION, THINKING & BEHAVIOR

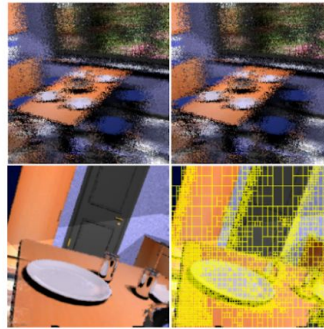




User experience

Simulating the flying experience for treating phobias, testing spatial and wayfinding ability, relating stress to mobile security, visual communication, **course projects** and currently, gaming experience and the relationship of UX to machine learning.

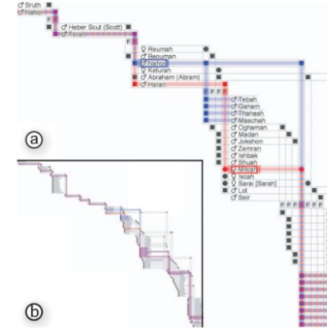
flying flying flying spatial
 wayfinding stress stress viscomm
 viscomm uxml uxml uxml



Computer graphics

Controlling visual fidelity and frame rates, foveated rendering, simplification, low latency rendering, procedural urban modeling, **course projects** and currently, multiview rendering.

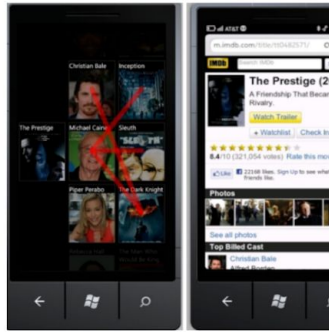
book latency latency latency
 foveation foveation foveation
 foveation simplification
 simplification fidelity fidelity fidelity
 lowlatency lowlatency urban urban
 urban urban urban multiview



Visualization

Depicting text, graphs, network traffic and urban commuters for retail, genealogy, security, search and sustainability. Also, visual communication, mobile visualization and currently, categorical visualization.

text text text graphs graphs
 security security search urban
 viscomm viscomm mobile



Mobiles

Relating stress and sensing to mobile security, improving mobile search, **course projects**, and currently, mobile shortcuts, location and visualization.

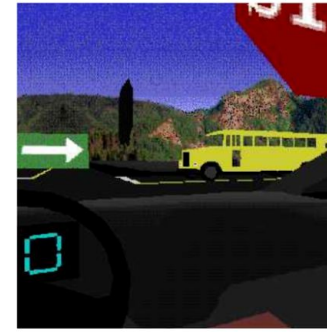
stress stress search location
visualization



Human-computer interaction

Search, placement and fidelity in virtual reality; tangible and tabletop interfaces for education, assessment and training; mobile search, security and sensing; and currently, shortcutting for desktops and mobiles.

latency latency latency foveation
foveation foveation foveation
fidelity fidelity fidelity tangible
tangible spatial wayfinding
wayfinding education education
stress stress search



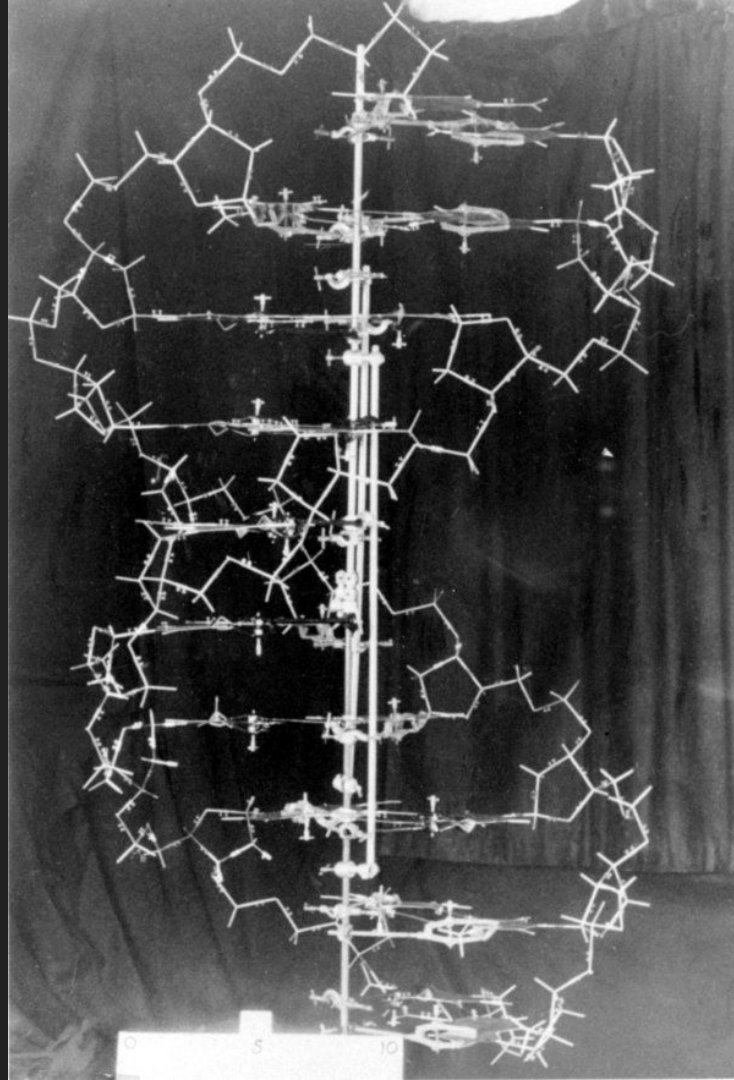
Virtual reality

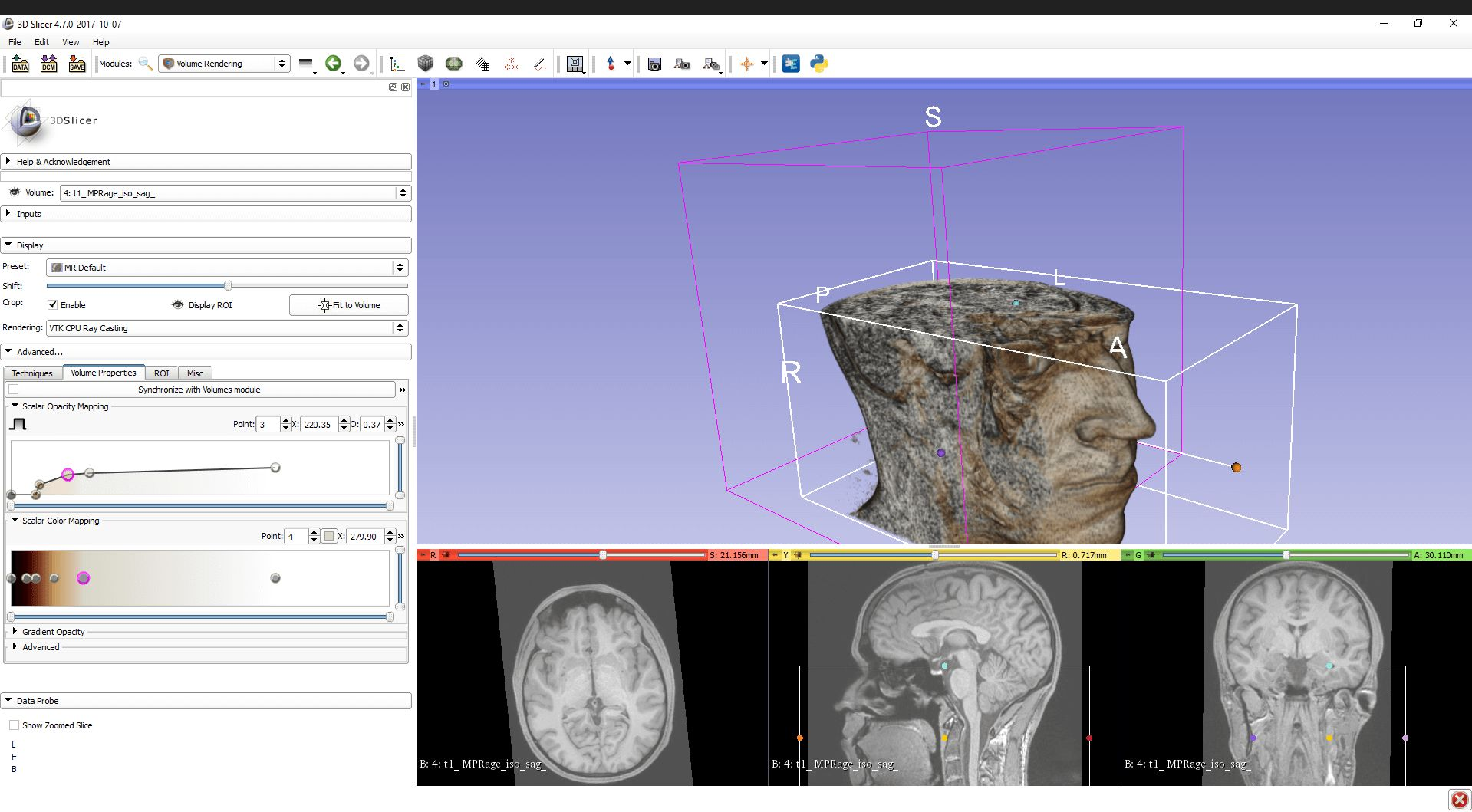
For therapy, health and training; foveation and latency control; with elderly users; in Japan; tracking, interaction and optical distortion.

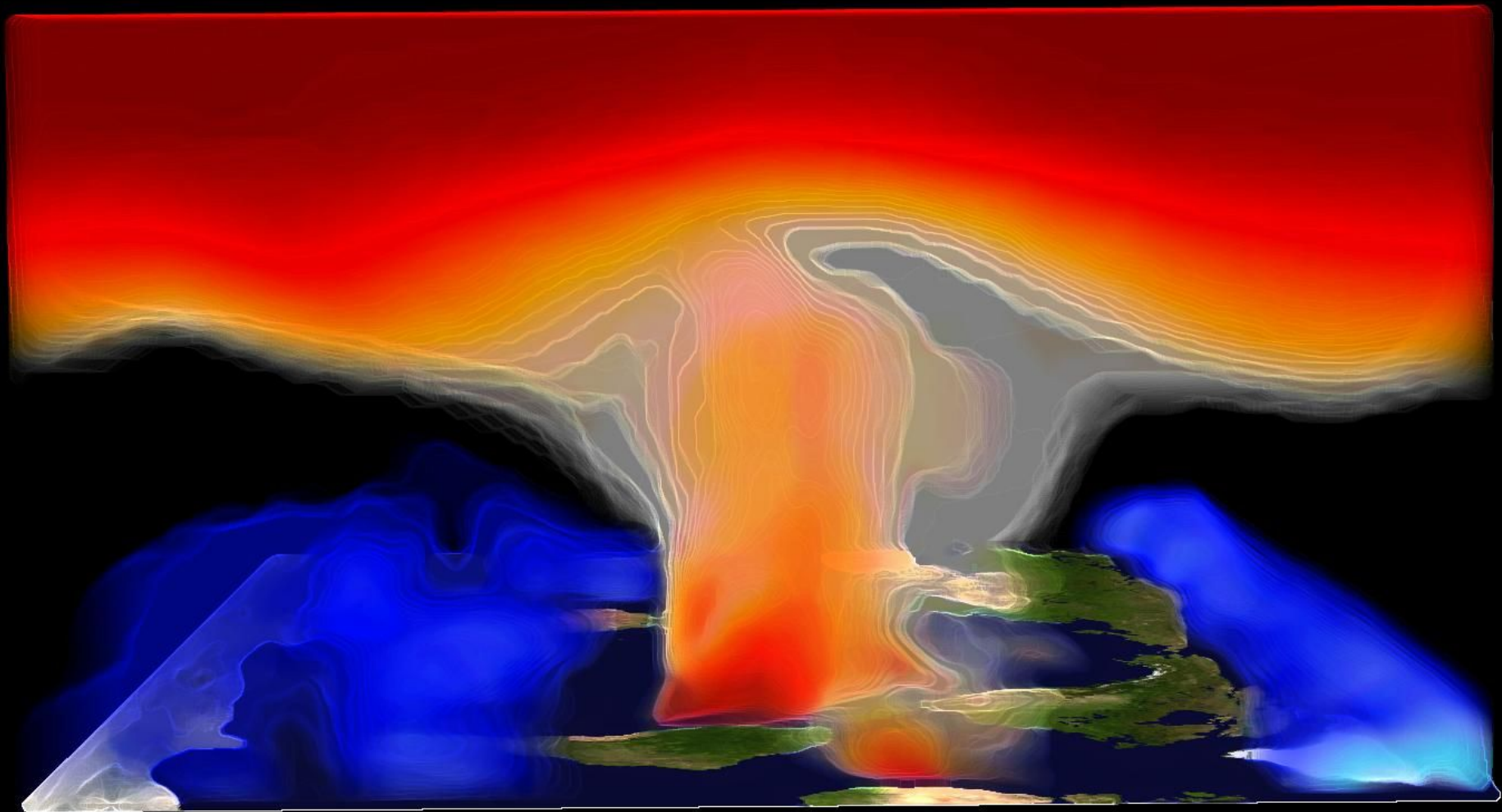
flying flying flying driving latency
latency latency foveation foveation
foveation foveation elderly japan
tracking 3dinteraction distortion

the vis we know

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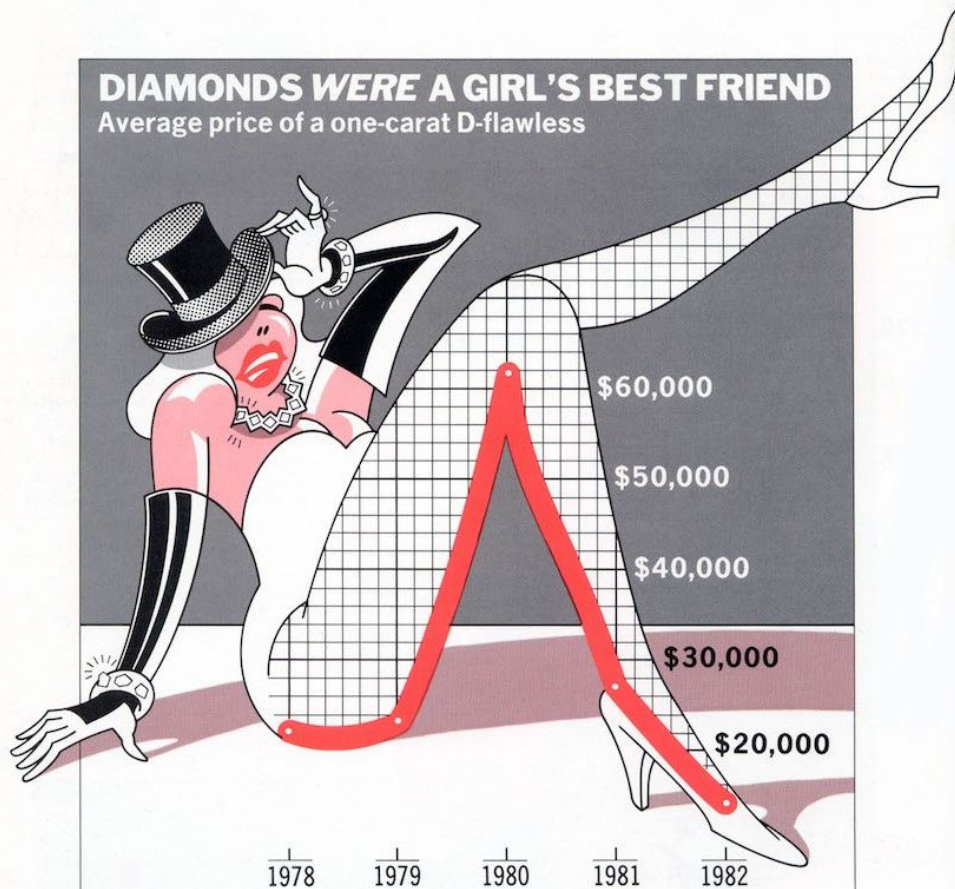


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DIAMONDS WERE A GIRL'S BEST FRIEND

Average price of a one-carat D-flawless



TIME Chart by Nigel Holmes

Source: The Diamond Registry



**GLOBAL WARMING
IN SIX DECADES**



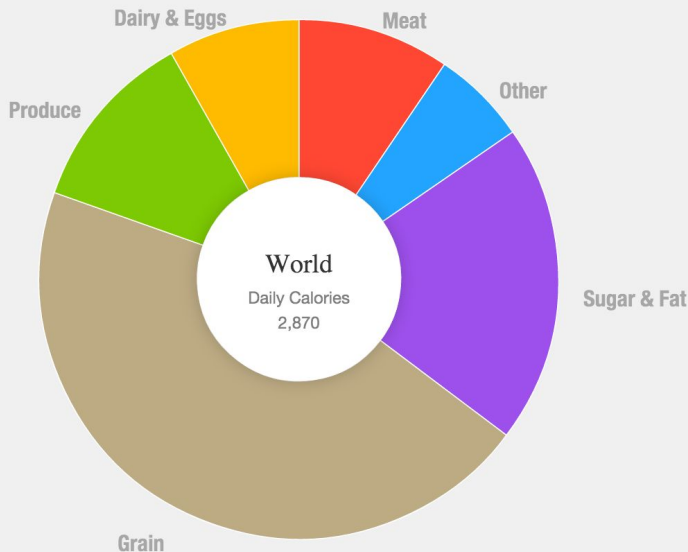


World

Daily diets vary considerably around the world. Select different countries or regions to see how consumption patterns have changed in the last 50 . Click on to understand the quantities of food consumed per person in each place. Alternatively, view the breakdown by to measure how that balance of food translates into fuel and energy. Percentages in the pie chart reflect the proportion of each item in the overall diet.

Calories per Person

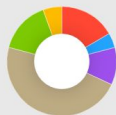
Grams per Person



2011

[About](#)

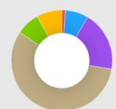
World



China



United States



India



Brazil



Hong Kong



Argentina



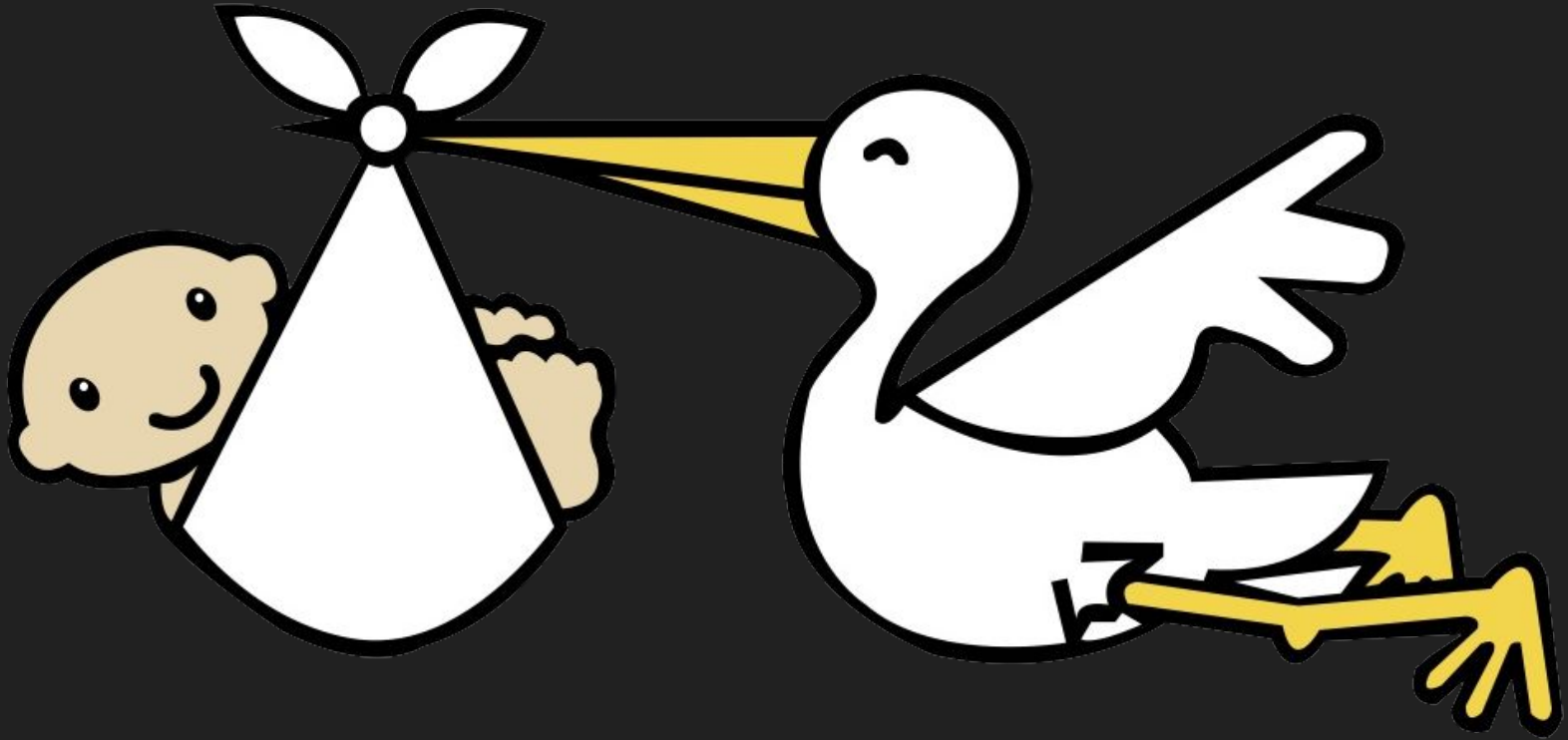
Russia*



Cuba

bottom line

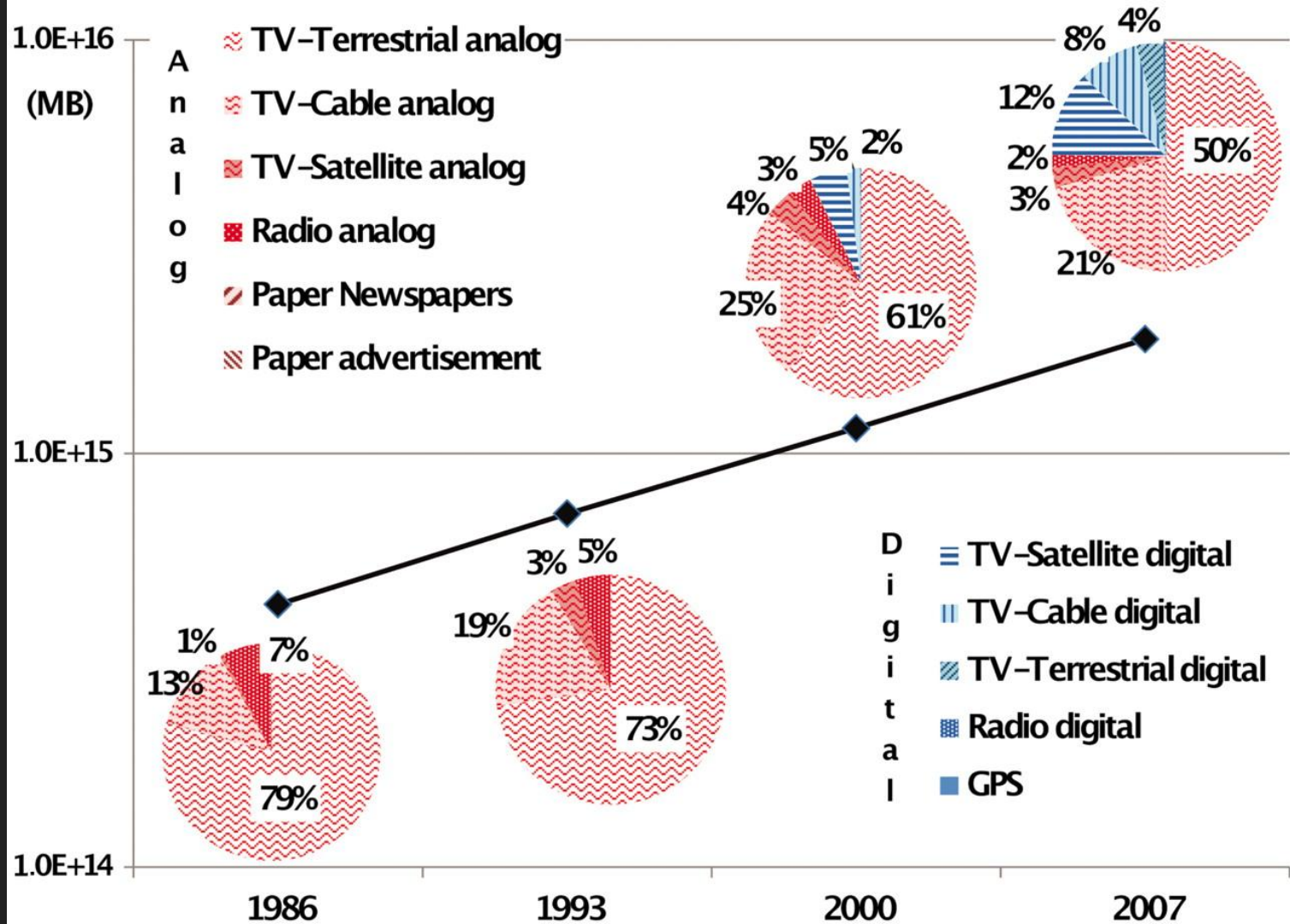
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it's a field! let's name it "data comm"

why now?

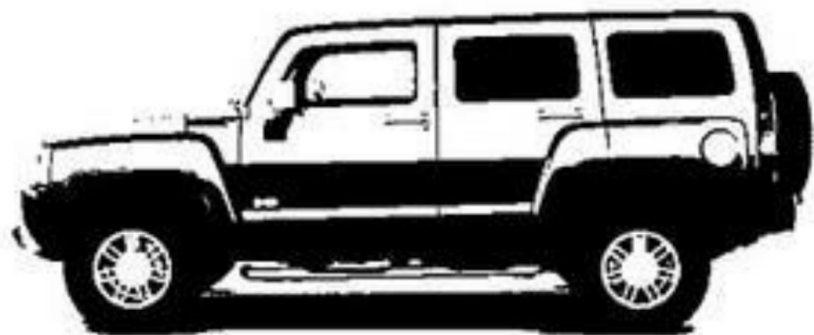
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**THIS ONE RUNS ON FAT
AND SAVES YOU MONEY**

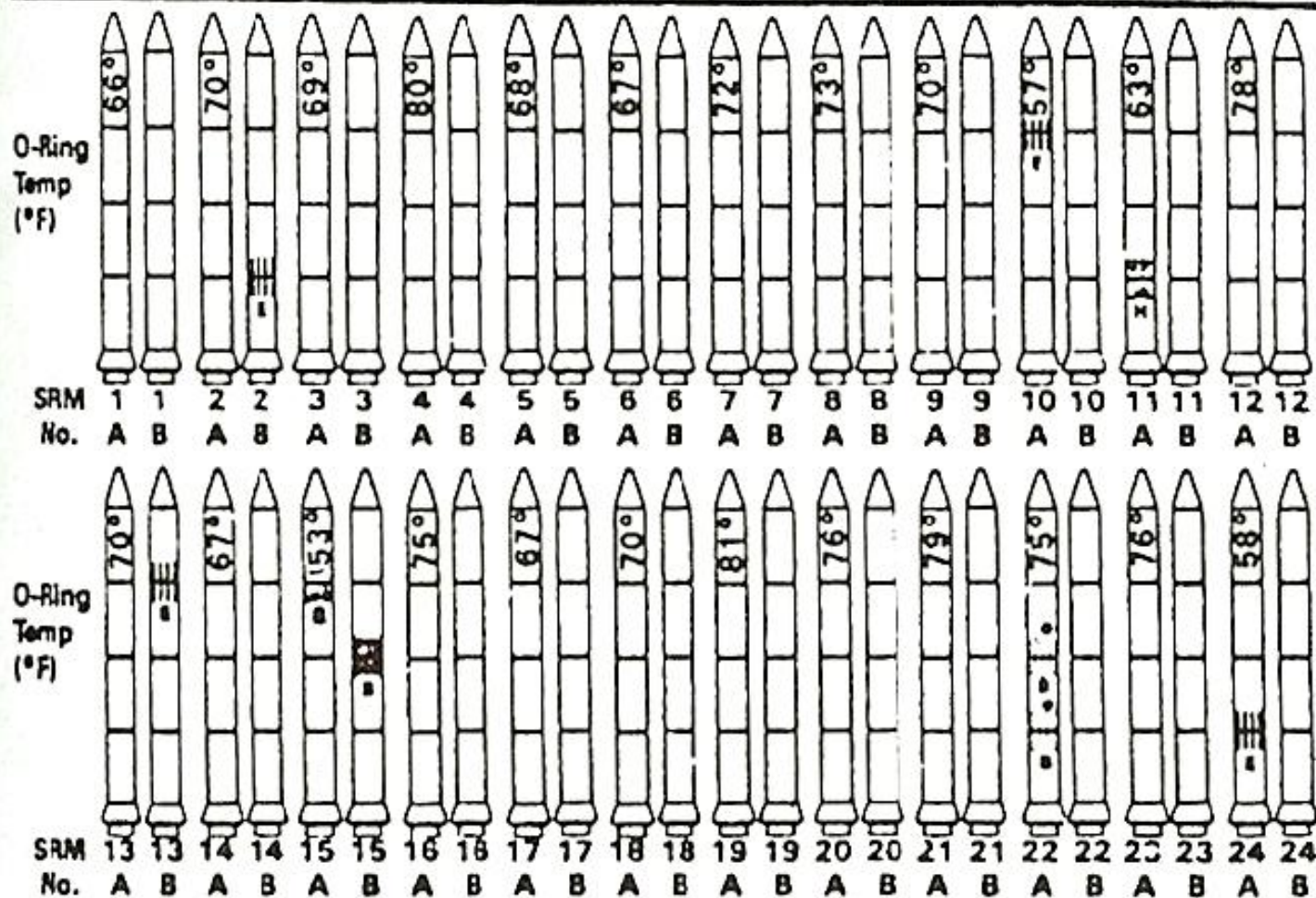


**THIS ONE RUNS ON MONEY
AND MAKES YOU FAT**

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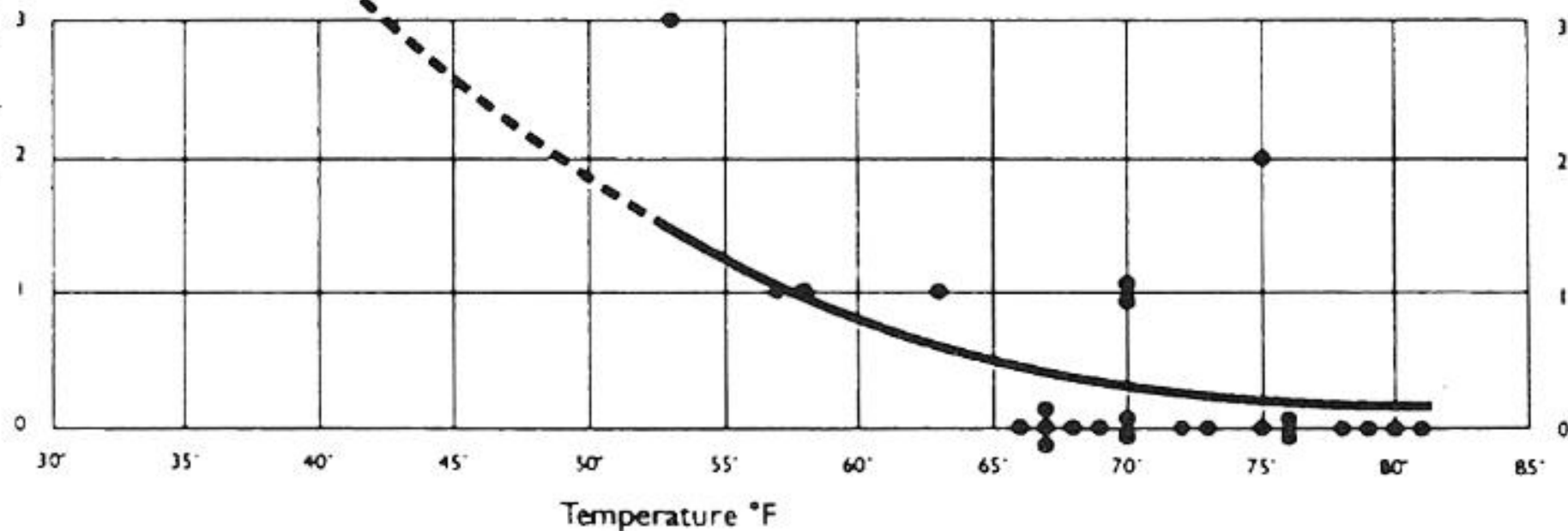
History of O-Ring Damage in Field Joints (Cont)

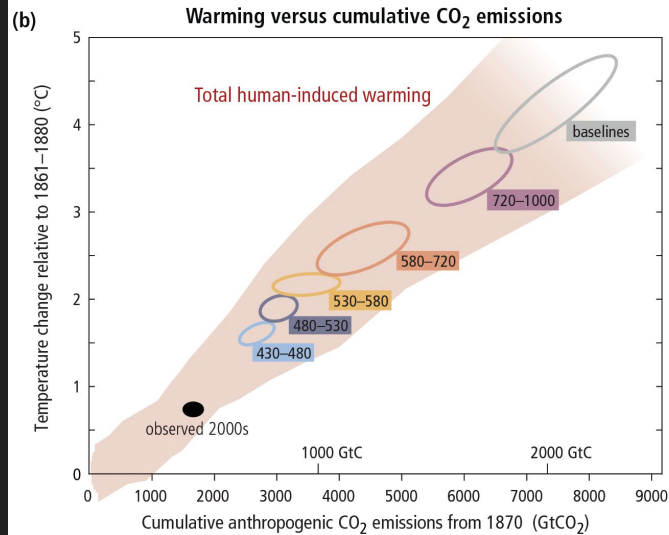
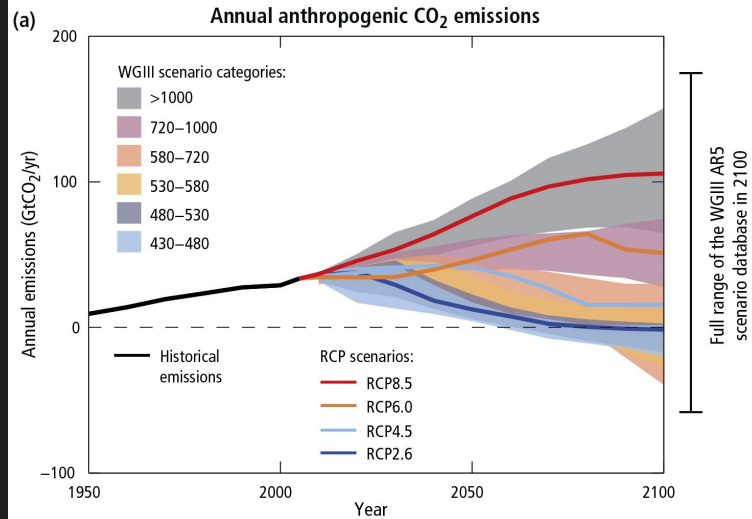


Extrapolation of damage curve to the cold
Challenger: 31° forecasted temperature for
launch on January 28, 1986.

Dots indicate temperature and O-ring damage for 24
successful launches prior to Challenger. Curve shows
increasing damage is related to cooler temperatures.

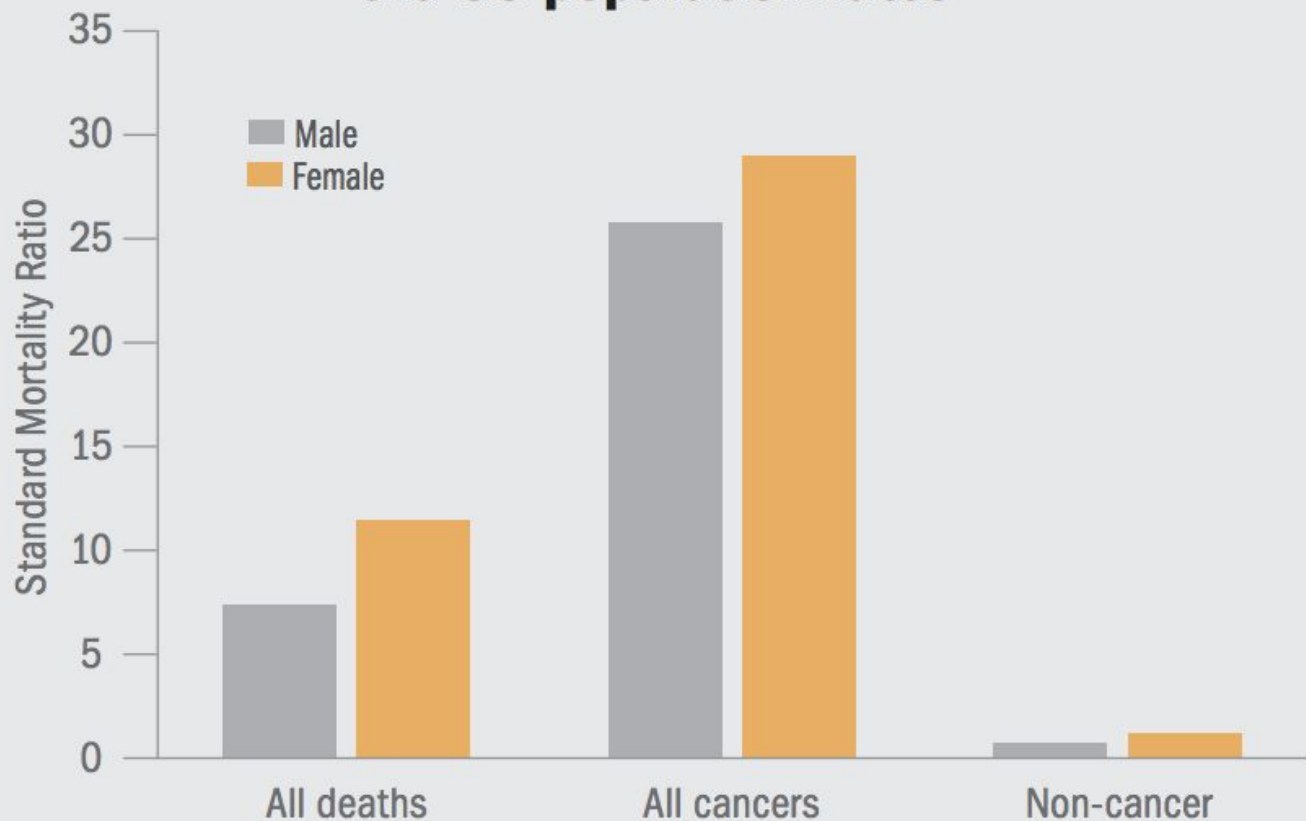
Number of damaged O-rings per launch





	RR	pH after 2 h <7.25		pH after 2 h 7.25–7.29		pH after 2 h ≥7.30	
		APACHE ≥29	APACHE <29	APACHE ≥29	APACHE <29	APACHE ≥29	APACHE <29
GCS 15	<30	72	35	27	7	11	3
	30–34	88	59	49	17	25	7
	≥35	93	73	64	27	38	11
GCS 12–14	<30	84	51	41	13	19	5
	30–34	93	74	65	28	39	12
	≥35	96	84	78	42	54	20
GCS ≤11	<30	93	74	65	28	39	12
	30–34	97	88	83	51	63	26
	≥35	99	93	90	66	76	40

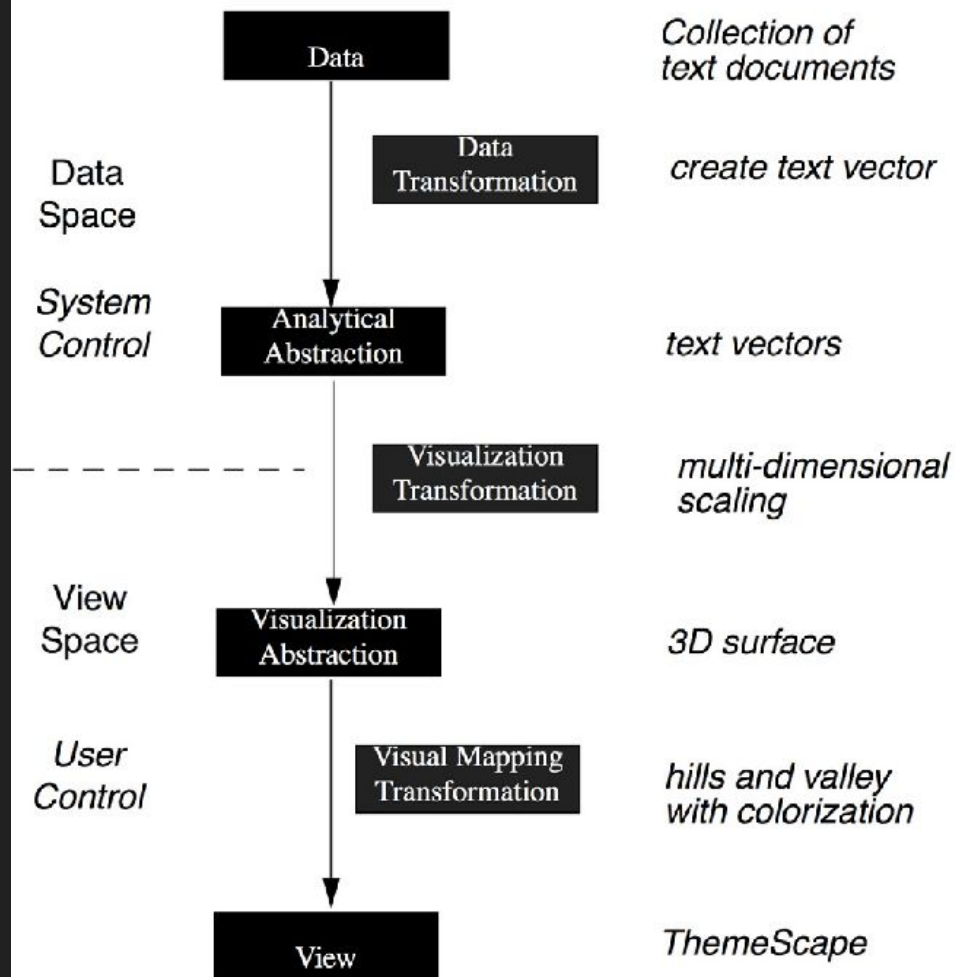
Relative risk of death compared to the US population rates



(Chart courtesy of Ruth Kleinerman, PhD)

Pipeline:

Example:



Known/Optimal Outcomes

Information



Values



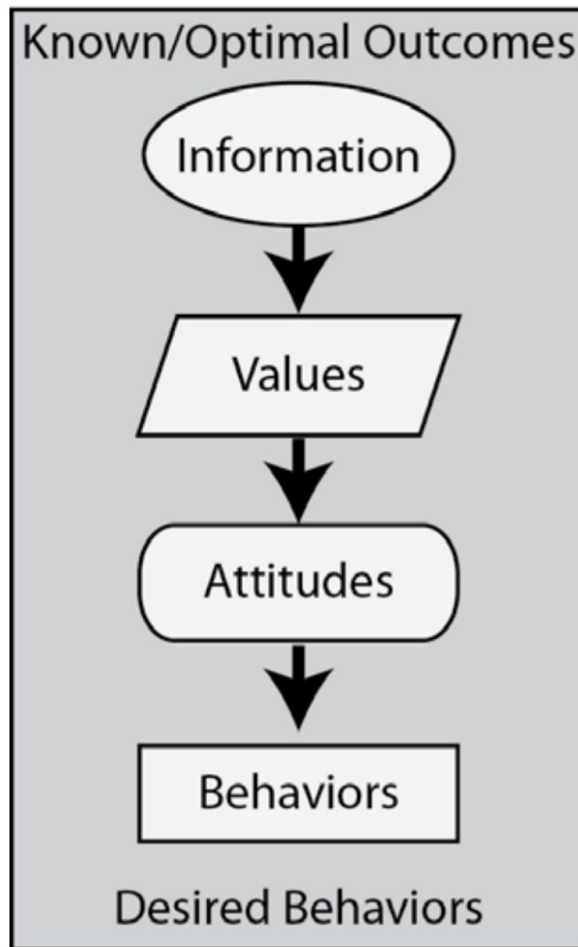
Attitudes



Behaviors

Desired Behaviors

Information Deficit

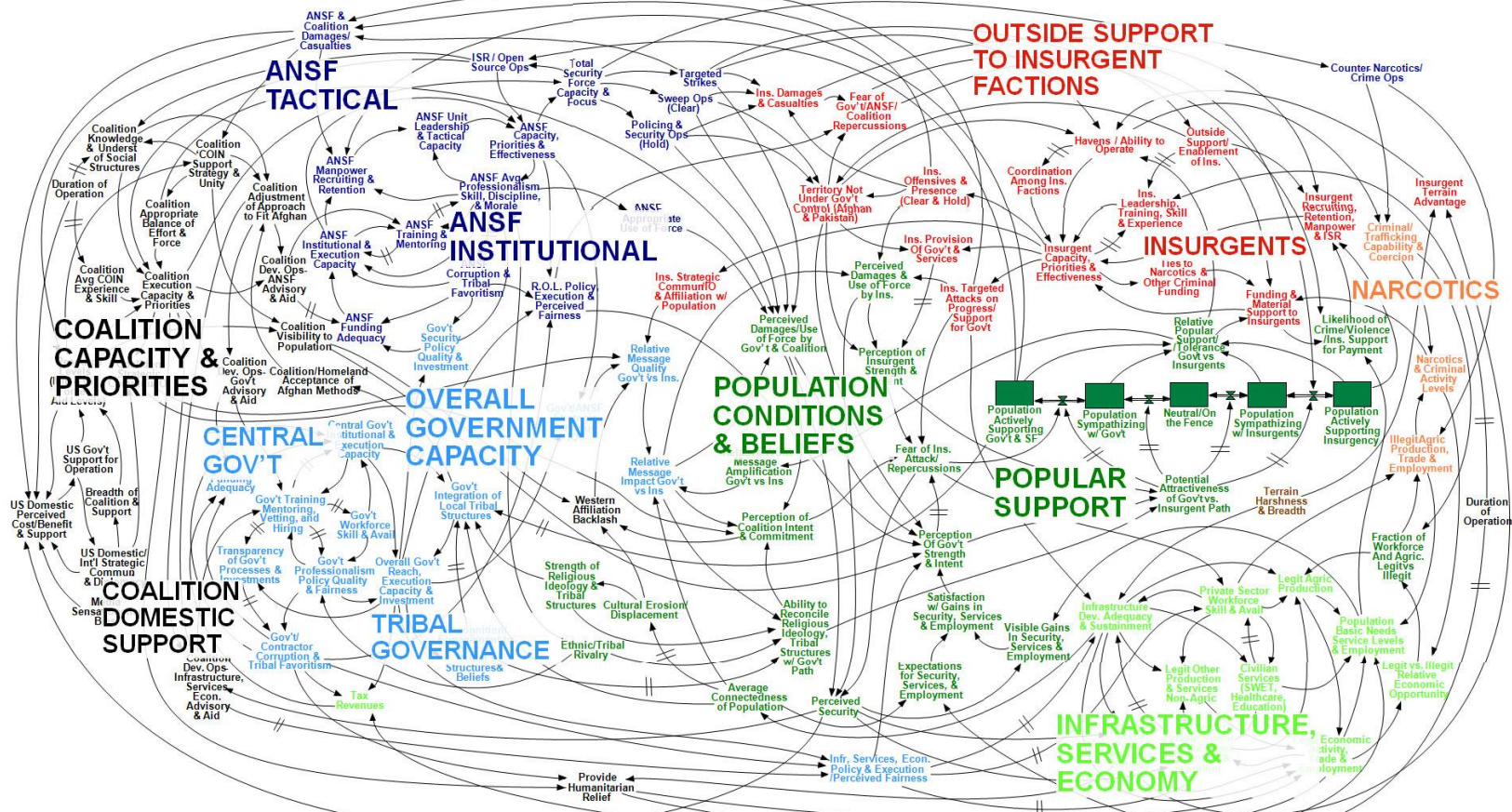


Afghanistan Stability / COIN Dynamics



= Significant Delay

- Population/Popular Support
- Infrastructure, Economy, & Services
- Government
- Afghanistan Security Forces
- Insurgents
- Crime and Narcotics
- Coalition Forces & Actions
- Physical Environment



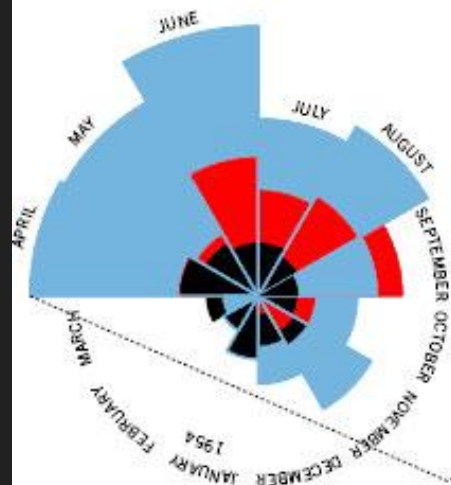


data comm wins

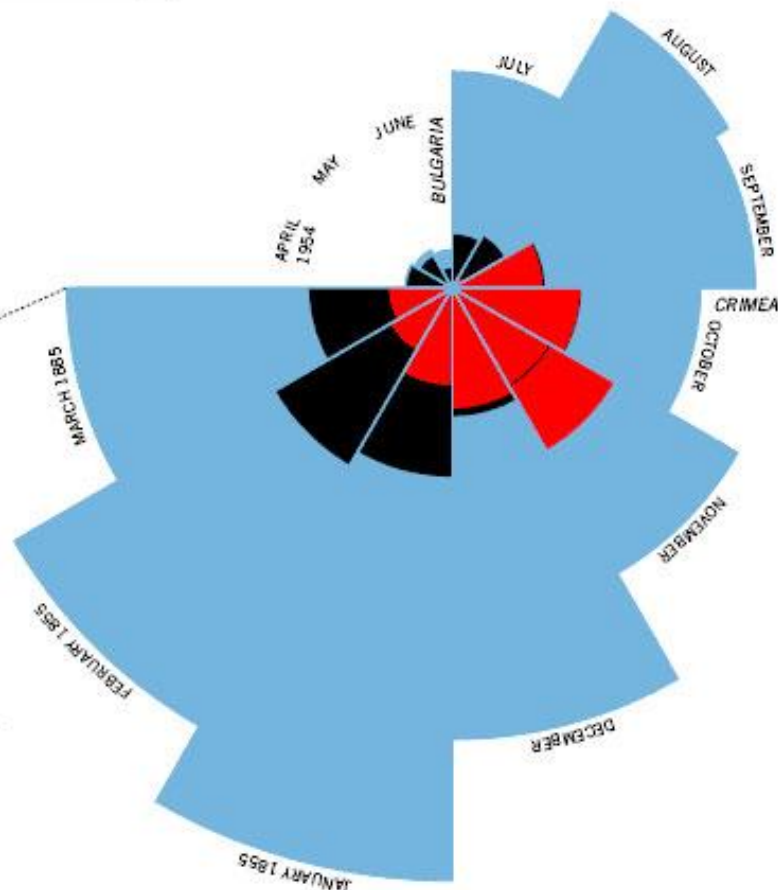
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DIAGRAM OF THE CAUSES OF MORTALITY IN THE ARMY IN THE EAST

2.
APRIL 1855 to MARCH 1856



1.
APRIL 1854 to MARCH 1855



The Areas of the blue, red, & black wedges are each measured from the centre as the common vertex

The blue wedges measured from the centre of the circle represent area for area the deaths from Preventible or Mitigable Zymotic Diseases, the red wedges measured from the centre the deaths from wounds, & the black wedges measured from the centre the deaths from all other causes

The black line across the red triangle in Nov' 1854 marks the boundary of the deaths from all other causes during the month

In October 1854, & April 1855, the black area coincides with the red, in January & February 1856, the blue coincides with the black

The entire areas may be compared by following the blue, the red & the black lines enclosing them.

METHADONE



CODEINE



HEROIN



OXYCODONE



HYDROCODONE



BUPRENORPHINE



FENTANYL



MORPHINE



Help this map take flight.



The darker the color, the more favorable the climate conditions are for survival. The outlined areas represent approximate current range for each season.
[More on reading these maps.](#)



Winter



Summer



Winter Range



Summer Range



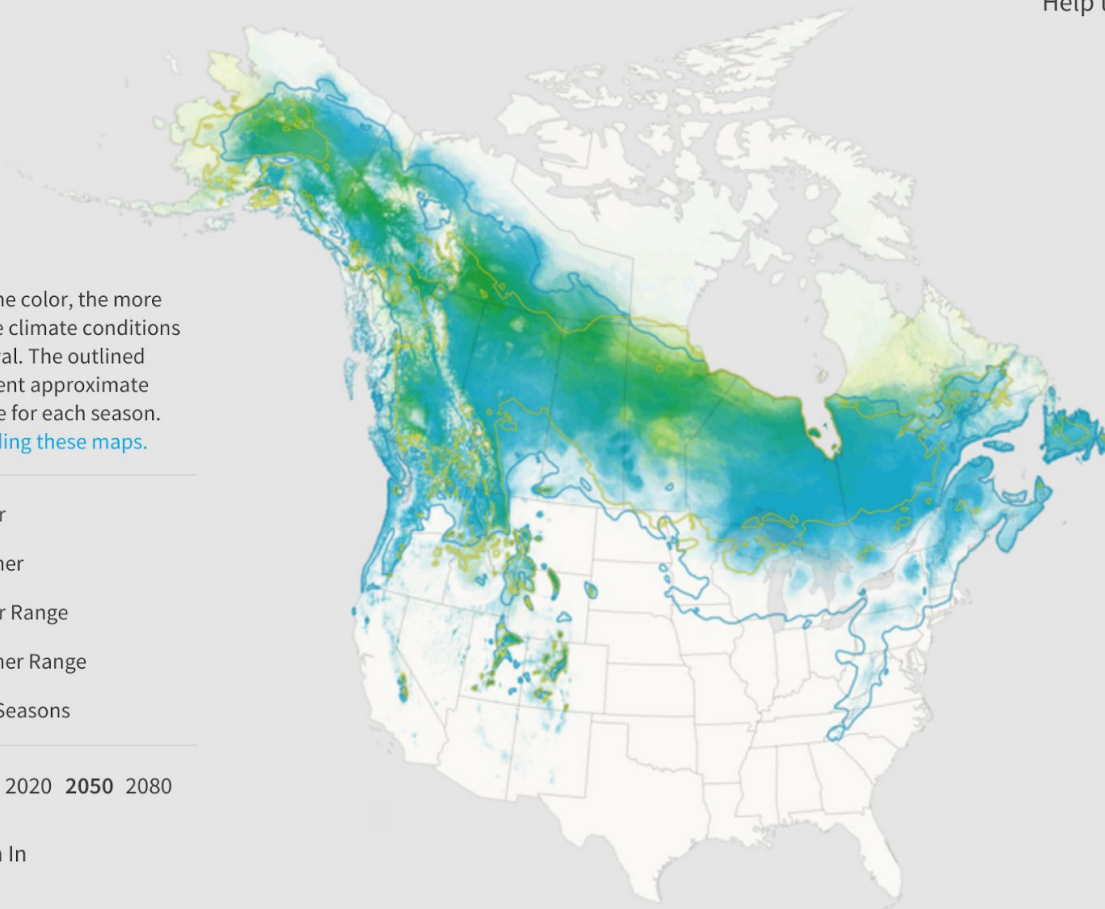
Both Seasons



2000 2020 2050 2080



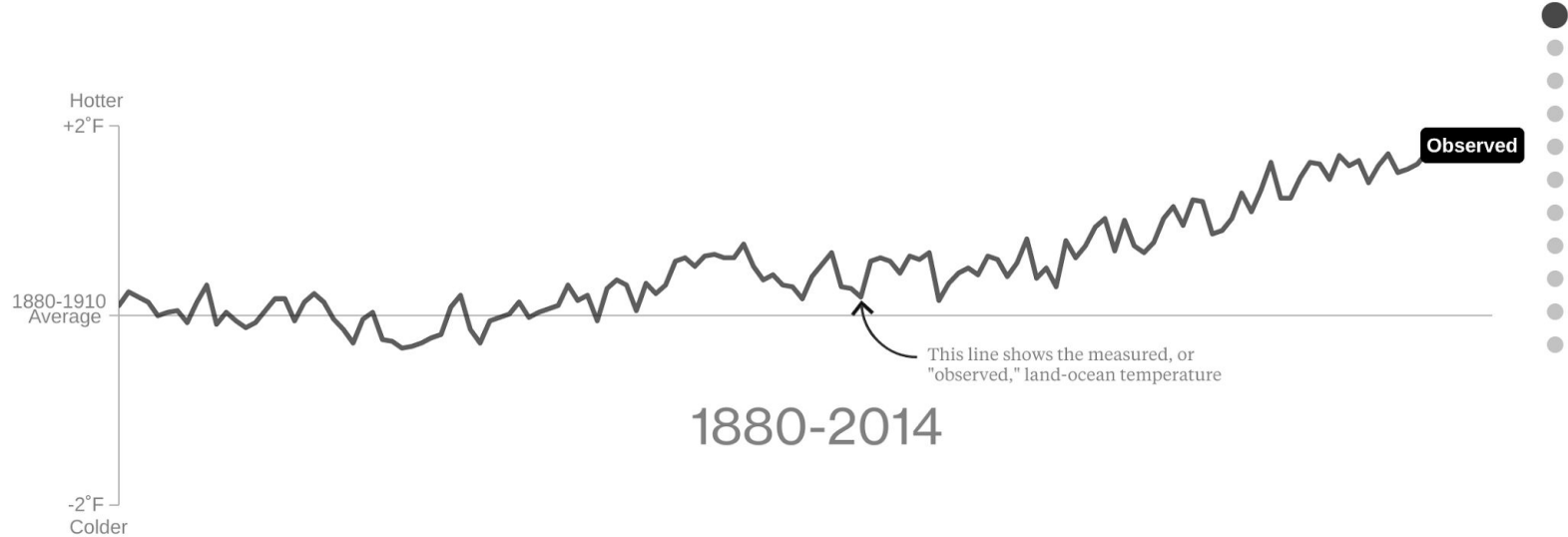
Zoom In



What's Really Warming the World?

By Eric Roston  and Blacki Migliozi  | June 24, 2015

Skeptics of manmade climate change offer various natural causes to explain why the Earth has warmed 1.4 degrees Fahrenheit since 1880. But can these account for the planet's rising temperature? Scroll down to see how much different factors, both natural and industrial, contribute to global warming, based on findings from NASA's Goddard Institute for Space Studies.



Out of Sight, Out of Mind.

[ATTACKS](#) [VICTIMS](#) [NEWS](#) [INFO](#) [SHARE](#)

PAKISTAN

ESTIMATED TOTAL FATALITIES **3341**

EN FR

CHILDREN
190 5.7

CIVILIAN
534 16%

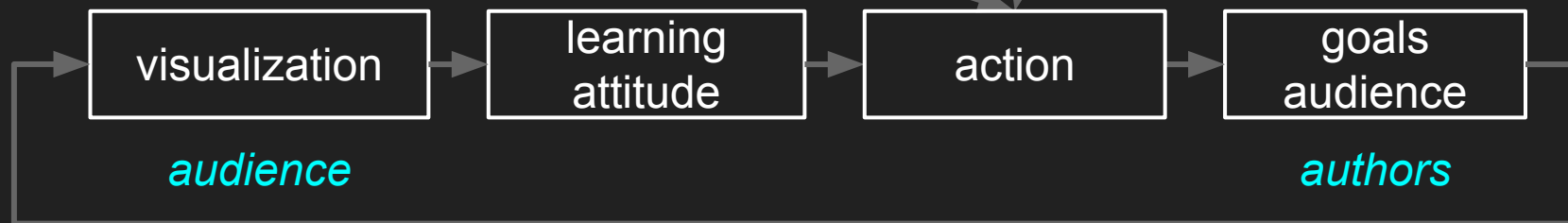
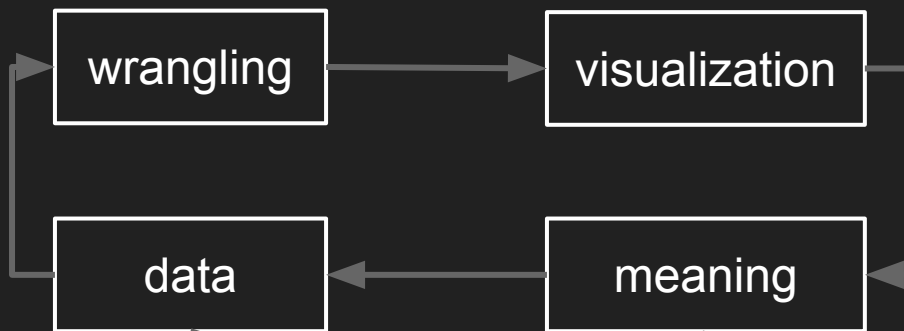
HIGH PROFILE
52 1.6%

OTHER
76.8% **2565**

2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015

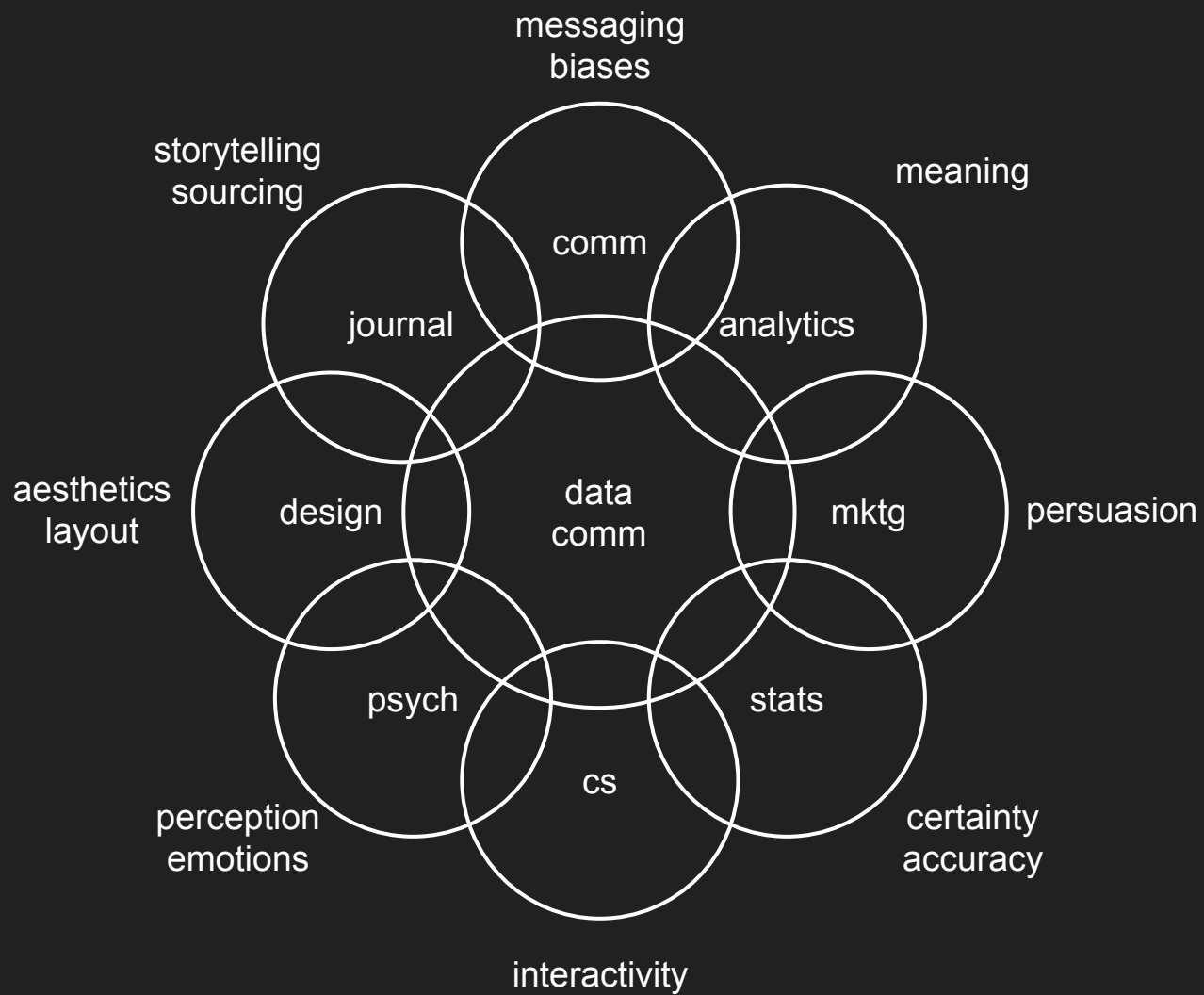
RECENT NEWS ABOUT DRONES

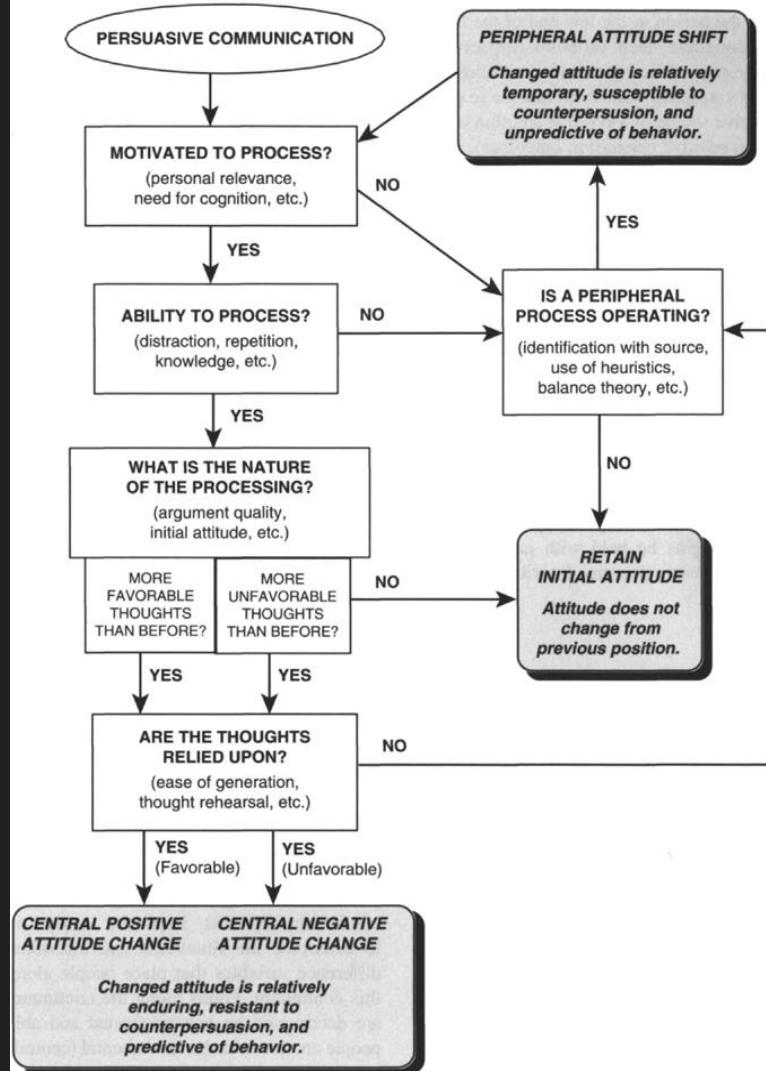
analysts



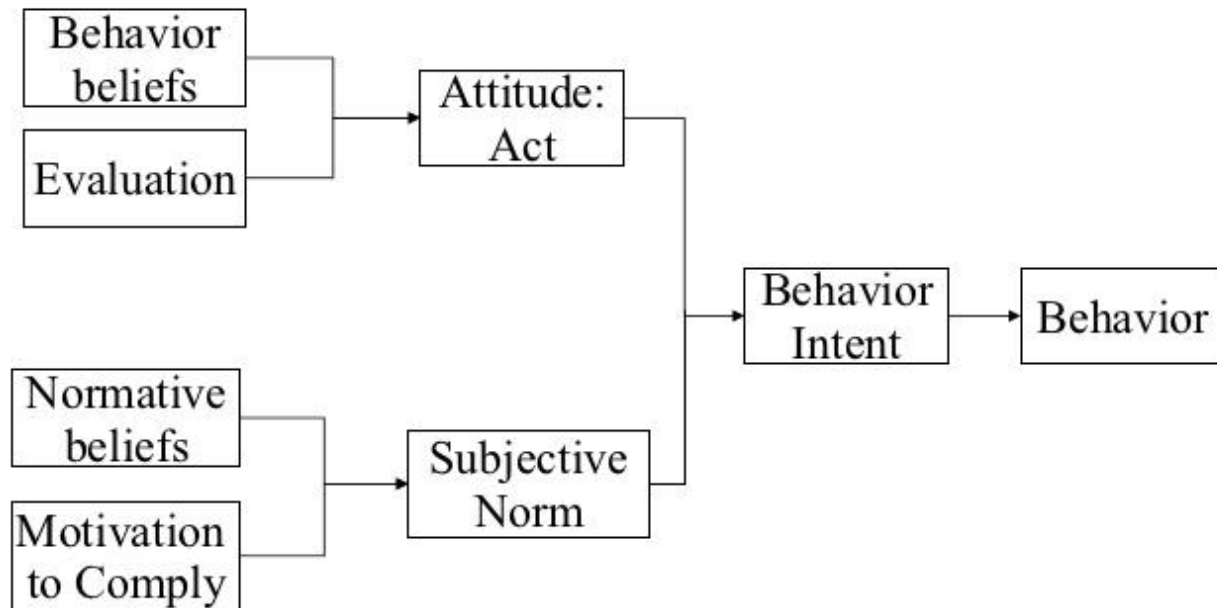
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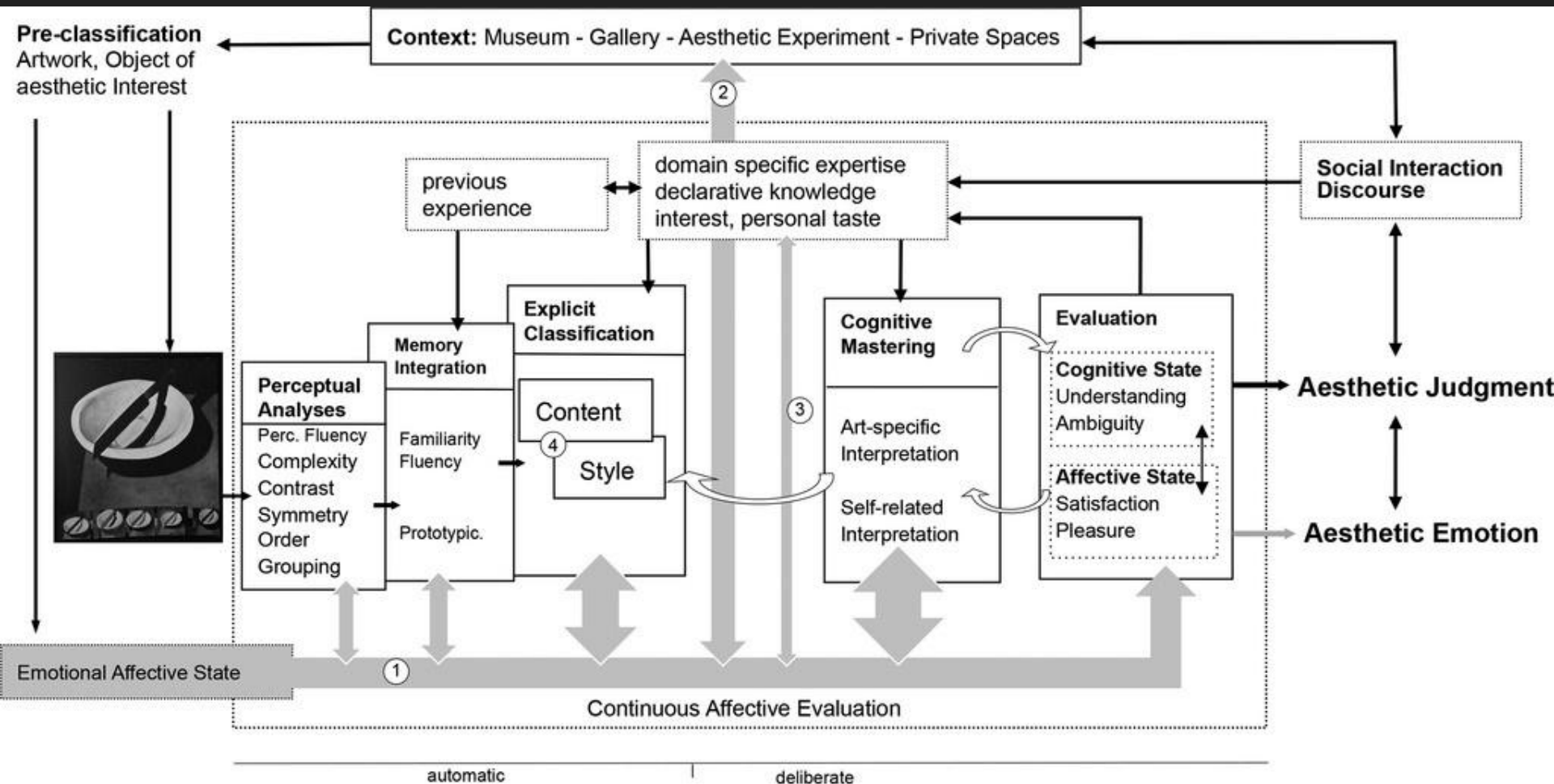




Attitudes and Behavior



Theory of Reasoned Action (Fishbein & Ajzen)



research

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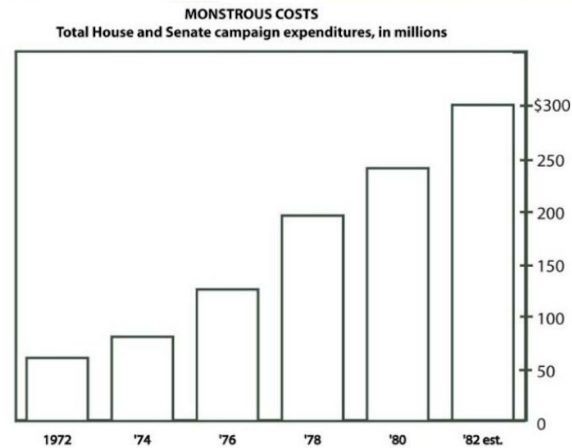
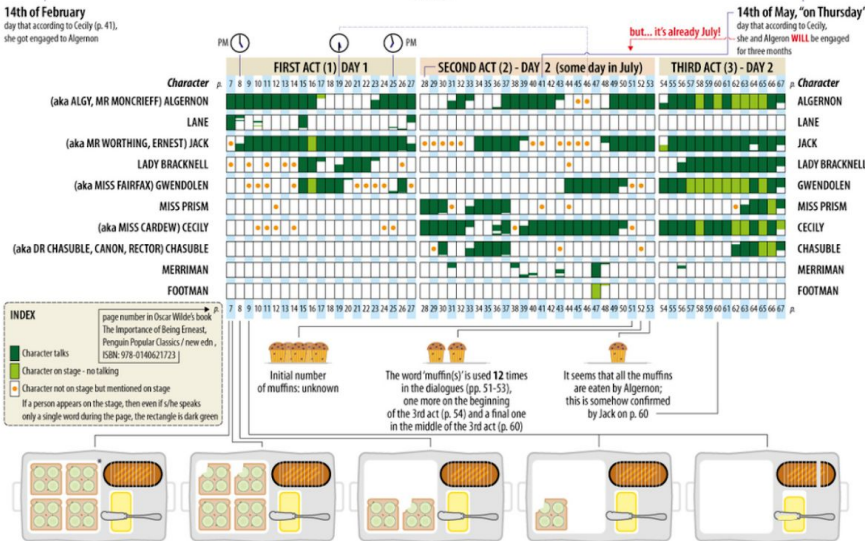


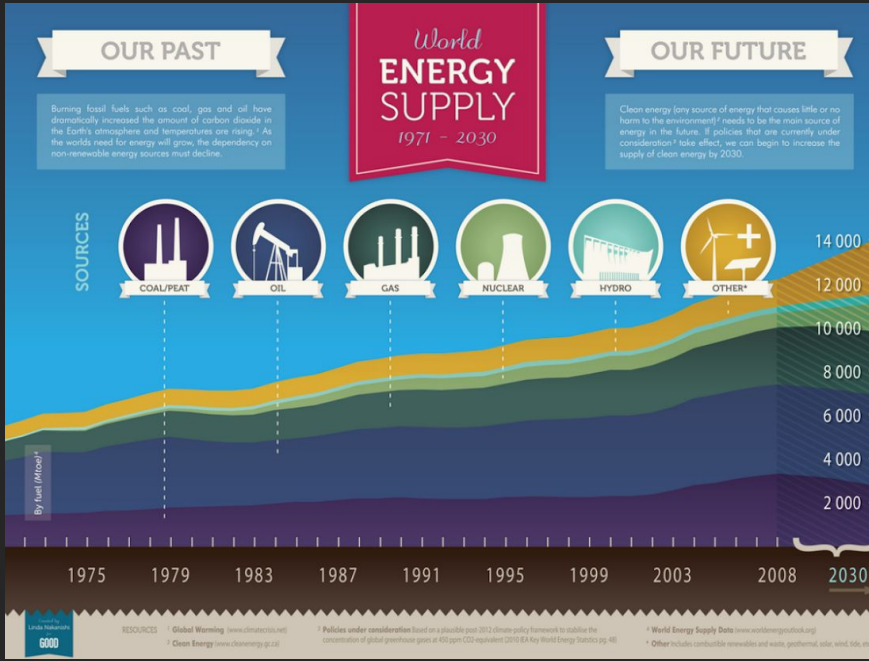
Figure 1. A chart by Holmes [7] (above), and a 'plain' version.

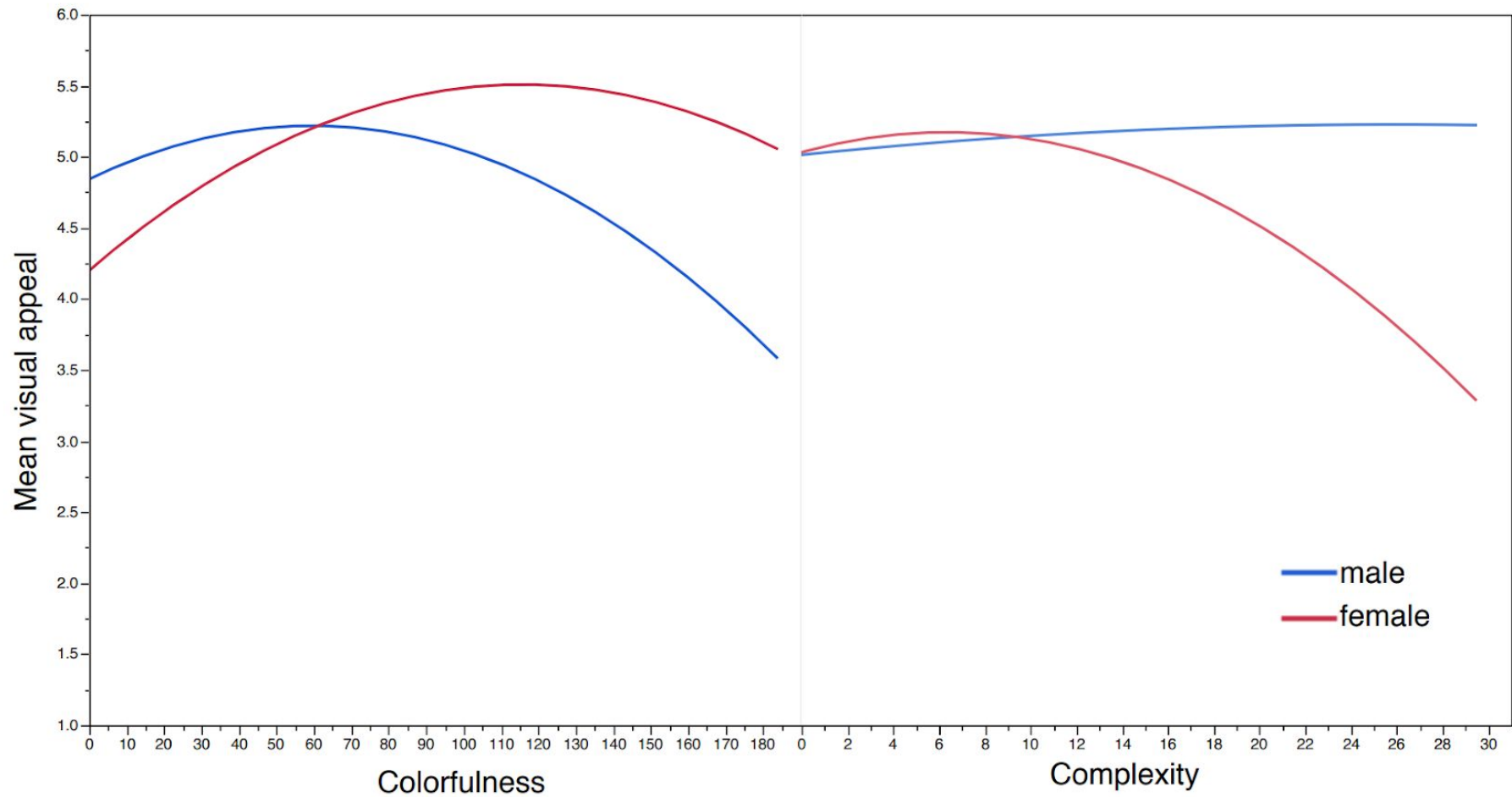
Oscar Wilde The Importance of Being Earnest

An infographic by The Missing Graph

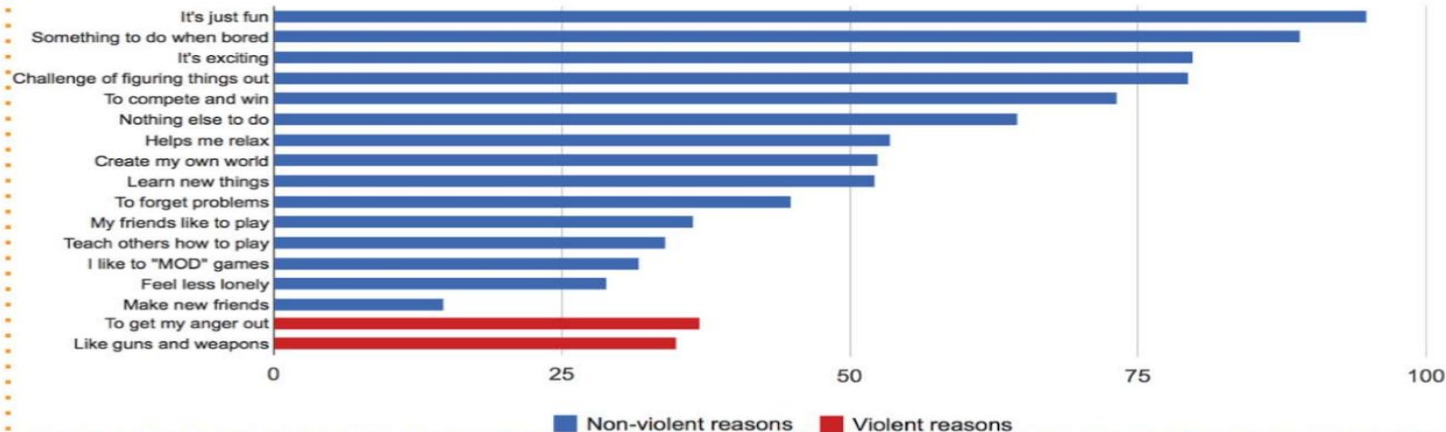


version 1.0 (25 March) © 2011 George Pimenton / ANTIFORMA Design http://themissinggraph.wordpress.com





Recorded response of children for playing computer games (in %).



Reasons for playing video games	Agree percentage	Reason type
It's just fun	94.85	Non-violent
Something to do when bored	89.05	Non-violent
It's exciting	79.8	Non-violent
Challenge of figuring things out	79.35	Non-violent
To compete and win	73.2	Non-violent
Nothing else to do	64.65	Non-violent
Helps me relax	53.5	Non-violent
Create my own world	52.5	Non-violent
Learn new things	52.25	Non-violent
To forget problems	45	Non-violent
My friends like to play	36.5	Non-violent
Teach others how to play	34	Non-violent
I like to "MOD" games	31.75	Non-violent
Feel less lonely	29	Non-violent
Make new friends	14.75	Non-violent
To get my anger out	37	Violent
Like guns and weapons	35	Violent

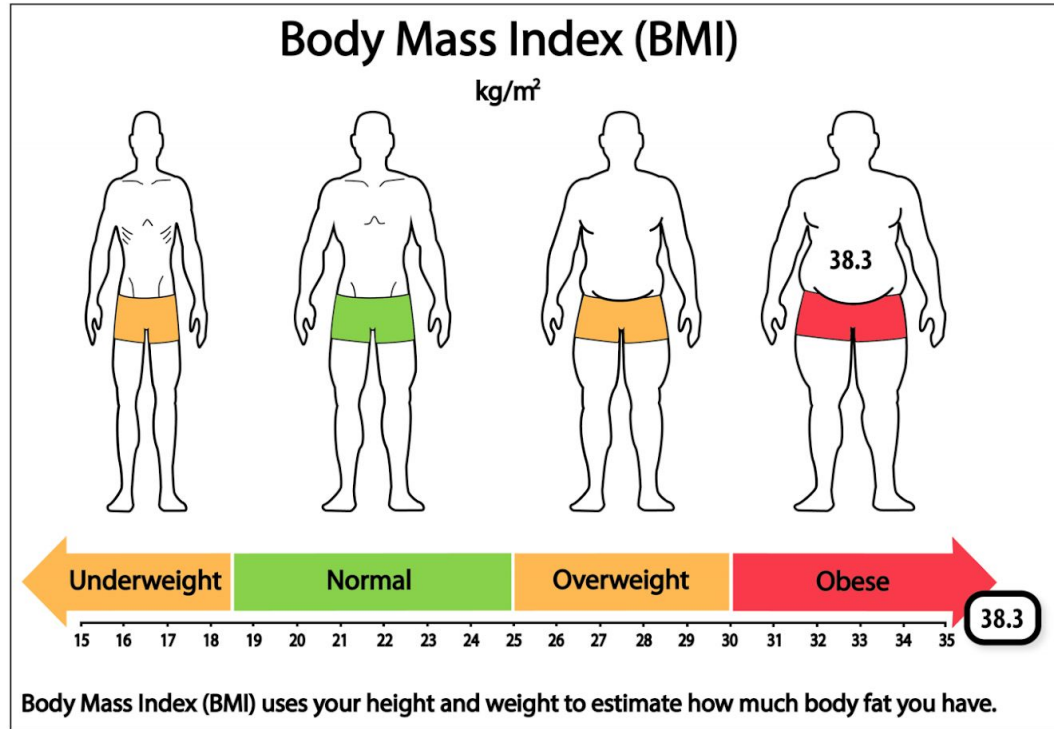


Figure 2: Body Mass Index (BMI) infographic from WICER showing an out-of-range value (38.3). Initially, we presented the body silhouettes (top portion) and the reference range number line (bottom portion) in participatory design sessions as separate graphical formats. We combined them into a single infographic at the suggestion of design session participants. The attributes of the data drove numerous design decisions.

(a)

Treated individuals



Nontreated individuals



(b)

Treated individuals



Nontreated individuals

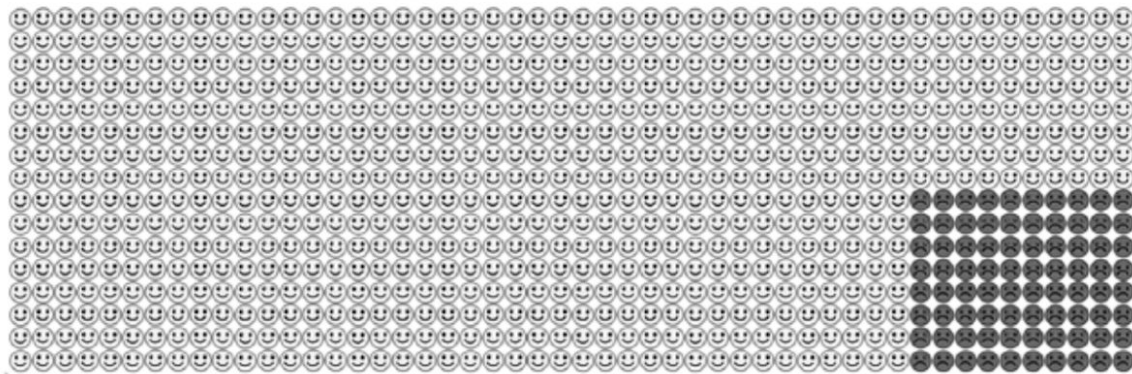


Figure 5. Icon arrays representing a treatment risk reduction of 50% with (a) equal and (b) different samples of treated and nontreated individuals. Affected individuals are represented in dark gray. Healthy individuals are represented in light gray.

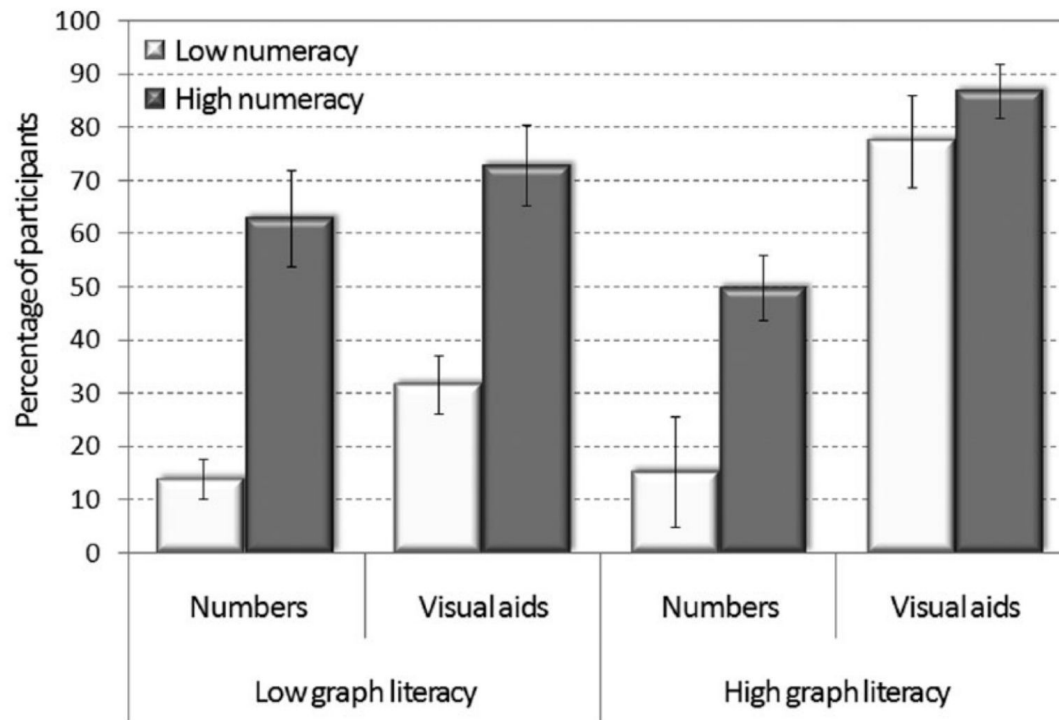


Figure 4. Percentage of participants with low and high numeracy and low and high graph literacy who correctly inferred treatment risk reduction, as a function of condition (numbers vs. visual aids). In the visual-aids condition, icon arrays and bars reported the entire population at risk. Error bars represent one standard error. Adapted from “Who Profits From Visual Aids: Overcoming Challenges in People’s Understanding of Risks,” by R. Garcia-Retamero and M. Galesic, 2010, *Social Science & Medicine*, 70, 1019–1025. Copyright 2010 by Elsevier Ltd. Adapted with permission.

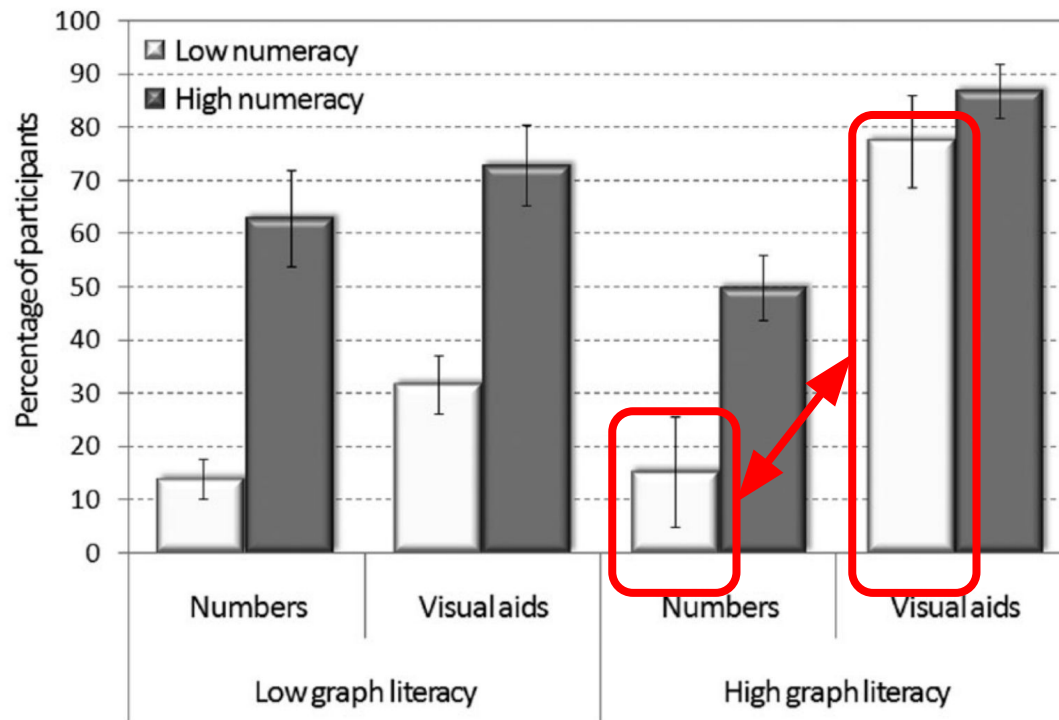


Figure 4. Percentage of participants with low and high numeracy and low and high graph literacy who correctly inferred treatment risk reduction, as a function of condition (numbers vs. visual aids). In the visual-aids condition, icon arrays and bars reported the entire population at risk. Error bars represent one standard error. Adapted from “Who Profits From Visual Aids: Overcoming Challenges in People’s Understanding of Risks,” by R. Garcia-Retamero and M. Galesic, 2010, *Social Science & Medicine*, 70, 1019–1025. Copyright 2010 by Elsevier Ltd. Adapted with permission.

The New York Times

Tuesday, March 27, 2018 Today's Paper Video 50°F FTSE 100 +1.76%

World U.S. Politics N.Y. Business Opinion Tech Science Health Sports Arts Books Style Food Travel Magazine T Magazine ALL

Expelling 60 Russians, U.S. Joins Allies in a Harsh Rebuke

By KATIE ROGERS and PETER BAKER

- President Trump ordered 60 Russian officials to leave the country, joining a coordinated campaign by two dozen countries to retaliate for the poisoning of a former Russian spy in Britain.
- The joint action intensified the conflict between Russia and the West, yet Mr. Trump avoided any public condemnation of Russia's role in the attack.

How an Outraged Europe Agreed to a Hard Line on Putin

By STEVEN ERLANGER 2:30 AM ET
Faced with new aggressiveness from the newly re-elected President Vladimir V. Putin, the European Union backed Britain and sent a strong message to Moscow.



Chip Somodevilla/Getty Images North America

She Was Shot in Parkland. Can She Turn Trauma Into Change?

Onstage, Samantha Fuentes, 18, is helping to lead a national conversation about gun control. Behind the scenes, she's reeling from mental and physical trauma.

By NEETI UPADHYE, YOUSUR AL-HLOU and NATALIE RENEAU
Following Citigroup, New Ways Banks Can Limit Gun Sales

Listen to 'The Daily': Violence as Daily Threat
Students on the South Side of Chicago joined protests spurred by the Florida school shooting, but they also felt frustration. Why hadn't gun violence in their community earned the same outrage?



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Opinion

New Leadership Has Not Changed Uber

By STEVEN HILL

Its business model has always been the same, and it's always been destructive.



EDITORIAL

Editorial: Tough Action on Russia, at Last, but More Is Needed

Freeze oligarchs' assets and bar them from Western banks, then start to protect the American electoral system.



- Scott Pruitt's Attack on Science Would Paralyze the E.P.A.
- Editorial: All the President's Thugs

Hello, Generation Putin

By IVAN KRASTEV

Vladimir Putin is installing a cohort of young, loyal technocrats in a bid to assure that his regime will endure without him.



- Editorial: New York City Subways Are Still Looking for a Savior
- Brooks: In Praise of Privilege
- Krugman: Putting the Ex-Con in Conservatism
- Yes, You Can Indict the President
- Beware of A.I. in Social Media Advertising
- What Was the Vietnam War About?
- Goldberg: Stormy Daniels Spanks Trump Again

READER CENTER »

Humans of Quebec: Portraits of Those I Met on My Road Trip

THE CROSSWORD »

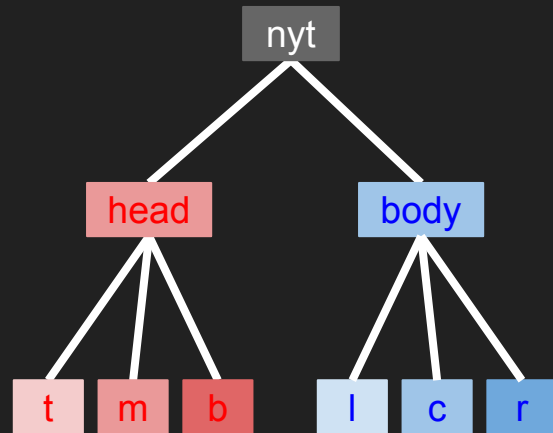
Play Today's Puzzle



6h **An admission of cheating** by the Australian cricket captain has stunned a sport that prides itself on fair play.



6h **The bullet that killed a gunman** in a Maryland school last week came from his own weapon, not from the gun of a school resource



none



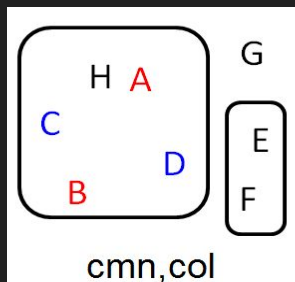
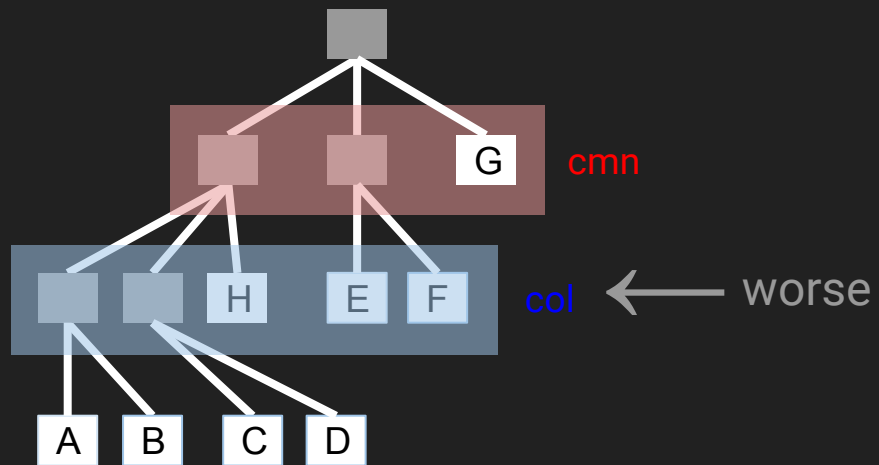
col



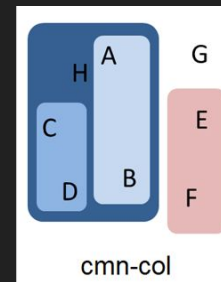
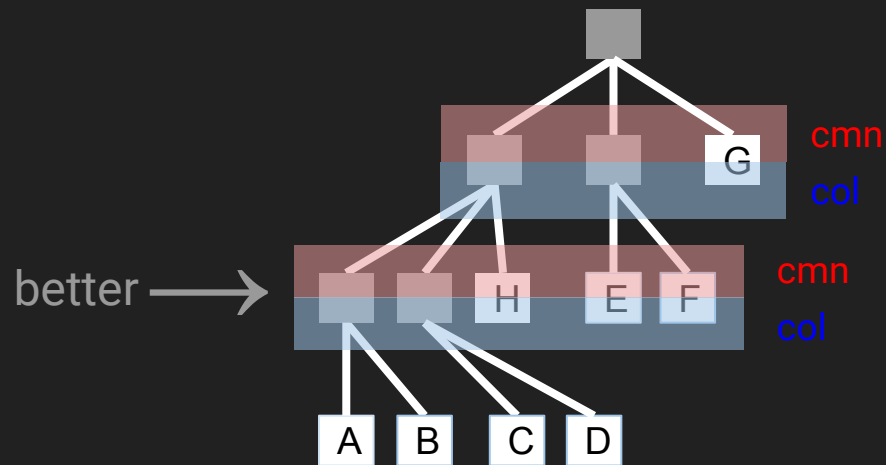
cmn



disjoint grouping



reinforced grouping



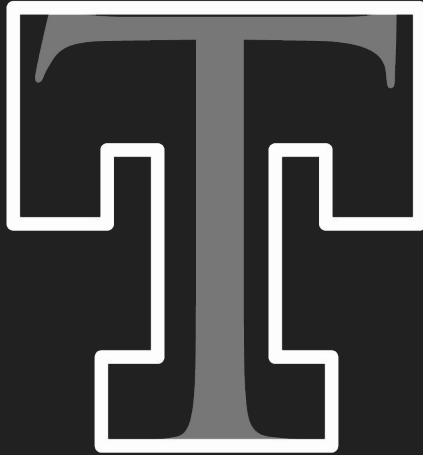
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the vis that is emerging
bottom line
why now?
trad vis fails
data comm wins
data comm breadth
research
instruction?
sources

the old individual domain

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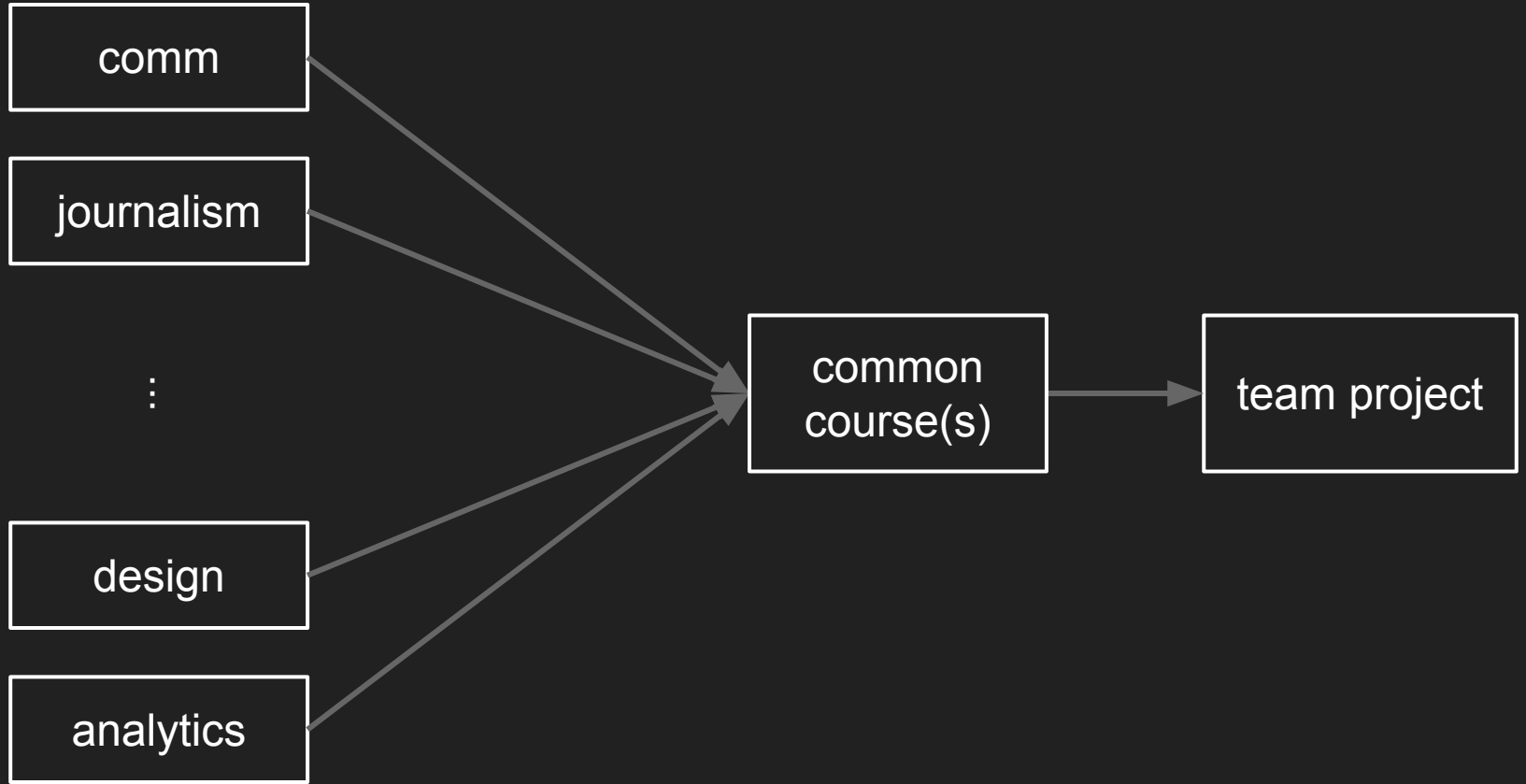
a data comm graduate...





...spans many disciplines





sources

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A K Peters Visualization Series

Data-Driven Storytelling

Edited by

Nathalie Henry Riche

Christophe Hurter

Nicholas Diakopoulos

Sheelagh Carpendale



CRC Press
Taylor & Francis Group

AN A K PETERS BOOK

Visualization for Communication (VisComm)

October 20th

9am - 12:20pm

Room 15

WORKSHOP SUMMARY

Date and Location: The workshop will be held on Sunday, October 20, 9am to 12:20pm at [IEEE VIS](#) in the Vancouver Convention Centre East Building.

While visualization research is still largely focused on data analysis, most people experience visualization as communication and presentation. The New York Times and other publications regularly release interactive visuals depicting complex datasets including political topics, budgets, and sports. An independent community of visualization practitioners and bloggers has also sprung up, producing and deconstructing visualizations of data of broad interest. Free visualization tools such as D3, Data Wrapper, Tableau Public, and others are available and widely used.

The VisComm workshop brings together practitioners and researchers from a broad range of disciplines to address questions raised by visualization's new communicative role. We encourage participation from journalists, designers and others that do not typically attend [IEEE Vis](#).

PROGRAM

VisComm Session 1: Visualization for Specific Audiences (9:00am - 10:30am)



Visualization Onboarding: Learning how to Read and Use Visualizations

Christina Stoiber, Florian-Gregor Grassinger, Margit Pohl, Holger Stitz, Marc Streit, and

thanks.
questions?

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