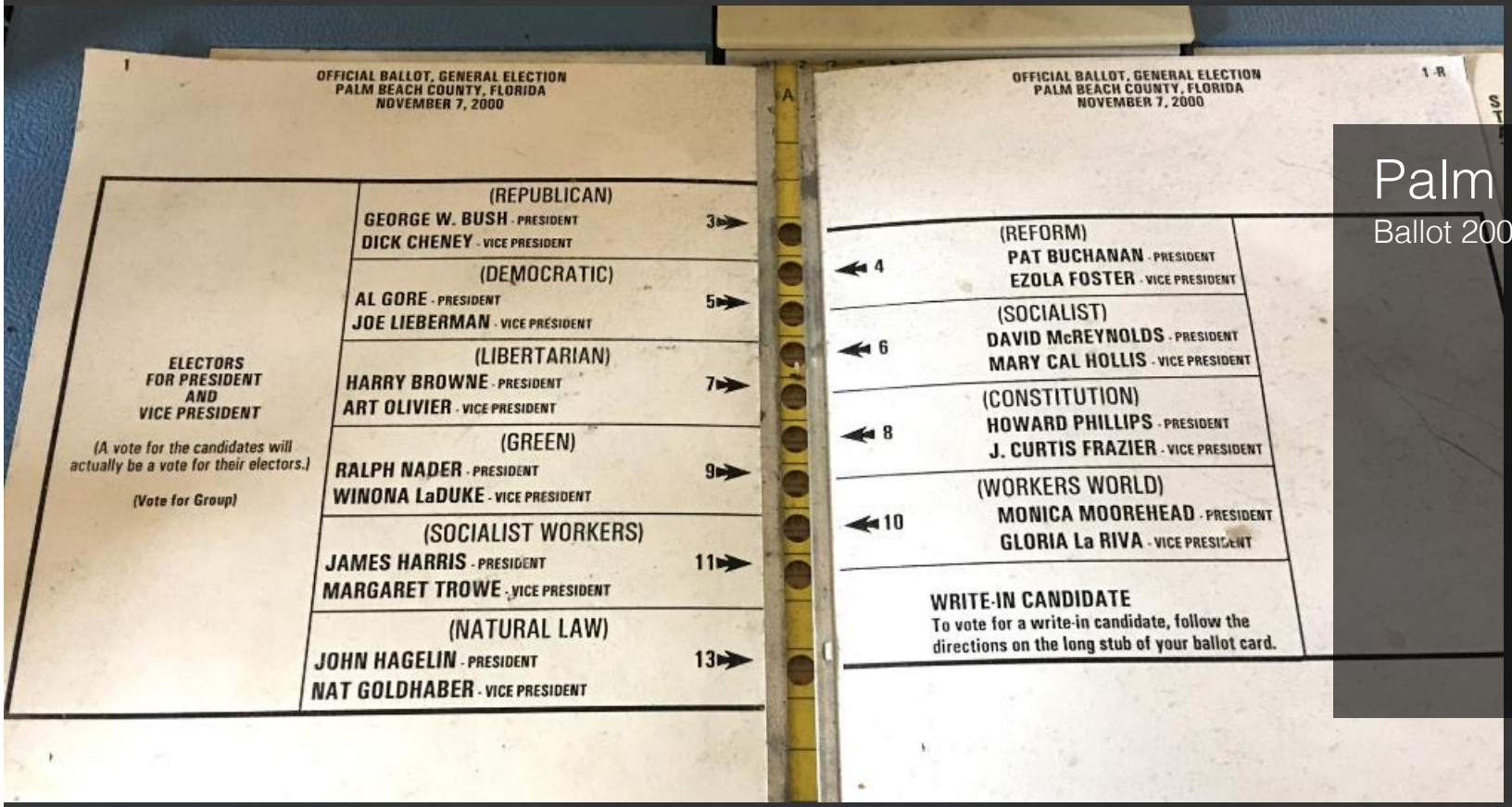
Visual Information Design

Prof. James A. Landay
Computer Science Department
Stanford University

Autumn 2023
October 23, 2023

* Based on slides by Luke Vink, Scott Klemmer, and James Landay

Hall of Fame or Shame?



OFFICIAL BALLOT, GENERAL ELECTION
PALM BEACH COUNTY, FLORIDA
NOVEMBER 7, 2000

1

ELECTORS FOR PRESIDENT AND VICE PRESIDENT

(A vote for the candidates will actually be a vote for their electors.)

(Vote for Group)

(REPUBLICAN)
GEORGE W. BUSH - PRESIDENT
DICK CHENEY - VICE PRESIDENT
3

(DEMOCRATIC)
AL GORE - PRESIDENT
JOE LIEBERMAN - VICE PRESIDENT
5

(LIBERTARIAN)
HARRY BROWNE - PRESIDENT
ART OLIVIER - VICE PRESIDENT
7

(GREEN)
RALPH NADER - PRESIDENT
WINONA LaDUKE - VICE PRESIDENT
9

(SOCIALIST WORKERS)
JAMES HARRIS - PRESIDENT
MARGARET TROWE - VICE PRESIDENT
11

(NATURAL LAW)
JOHN HAGELIN - PRESIDENT
NAT GOLDHABER - VICE PRESIDENT
13

OFFICIAL BALLOT, GENERAL ELECTION
PALM BEACH COUNTY, FLORIDA
NOVEMBER 7, 2000

1-R

(REFORM)
PAT BUCHANAN - PRESIDENT
EZOLA FOSTER - VICE PRESIDENT
4

(SOCIALIST)
DAVID McREYNOLDS - PRESIDENT
MARY CAL HOLLIS - VICE PRESIDENT
6

(CONSTITUTION)
HOWARD PHILLIPS - PRESIDENT
J. CURTIS FRAZIER - VICE PRESIDENT
8

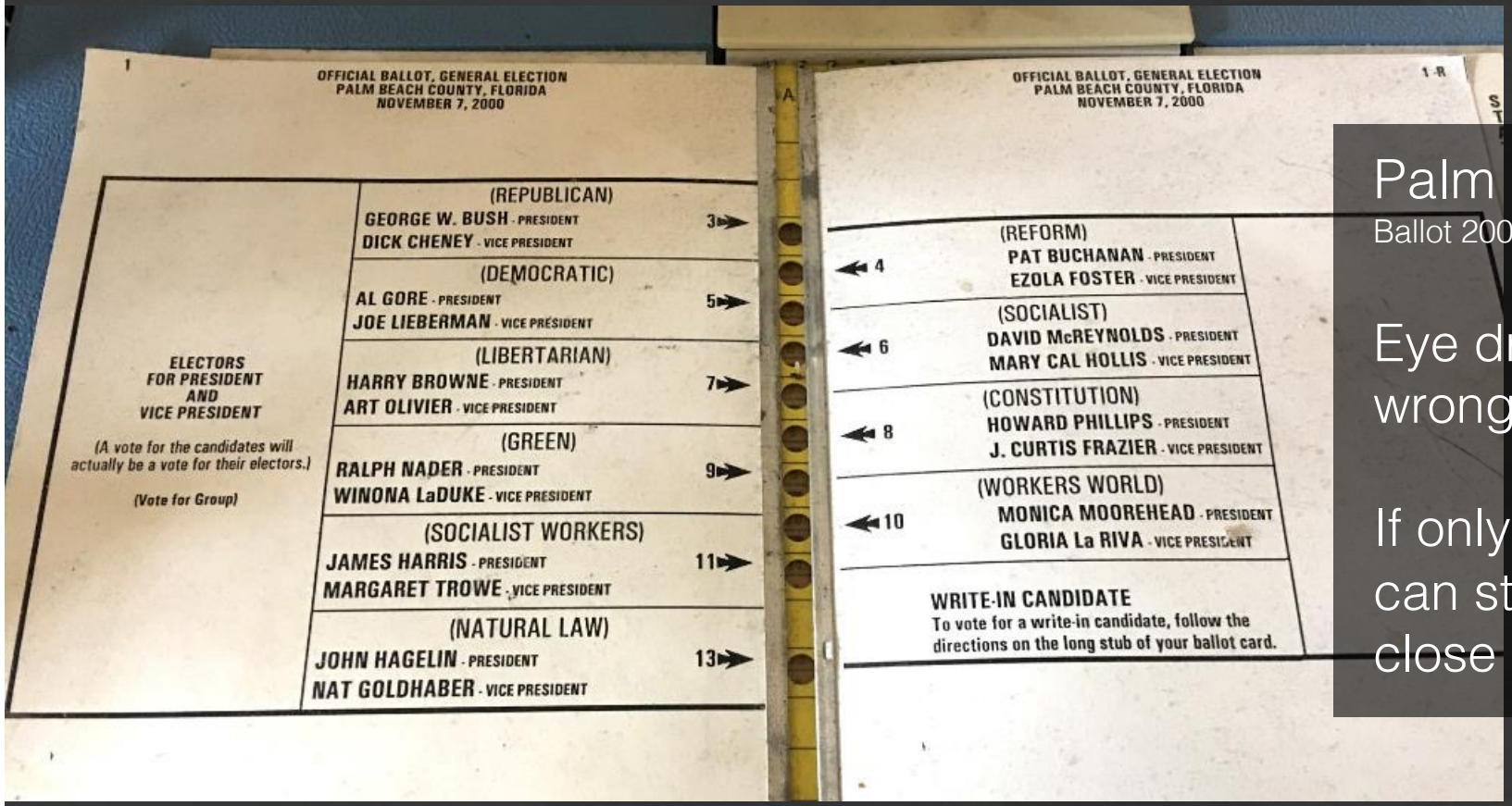
(WORKERS WORLD)
MONICA MOOREHEAD - PRESIDENT
GLORIA La RIVA - VICE PRESIDENT
10

WRITE-IN CANDIDATE
To vote for a write-in candidate, follow the directions on the long stub of your ballot card.

Palm Beach, Florida

Ballot 2000

Hall of Shame!

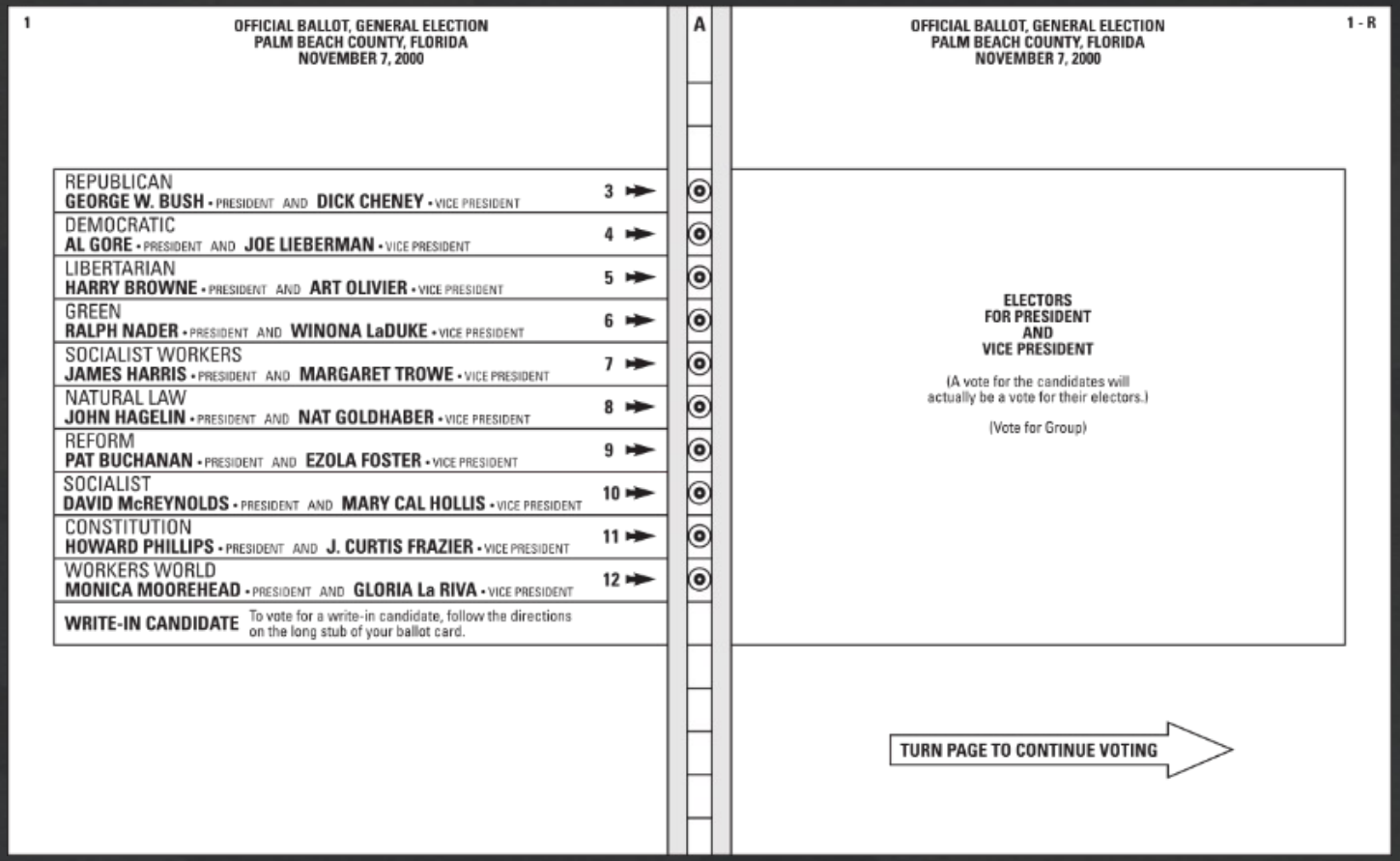


Palm Beach, Florida
Ballot 2000

Eye drawn to the wrong holes

If only 1% error rate, can still change a close election

One Possible Redesign



1

OFFICIAL BALLOT, GENERAL ELECTION
PALM BEACH COUNTY, FLORIDA
NOVEMBER 7, 2000

REPUBLICAN **GEORGE W. BUSH** • PRESIDENT AND **DICK CHENEY** • VICE PRESIDENT	3 ➡	◎
DEMOCRATIC **AL GORE** • PRESIDENT AND **JOE LIEBERMAN** • VICE PRESIDENT	4 ➡	◎
LIBERTARIAN **HARRY BROWNE** • PRESIDENT AND **ART OLIVIER** • VICE PRESIDENT	5 ➡	◎
GREEN **RALPH NADER** • PRESIDENT AND **WINONA LaDUKE** • VICE PRESIDENT	6 ➡	◎
SOCIALIST WORKERS **JAMES HARRIS** • PRESIDENT AND **MARGARET TROWE** • VICE PRESIDENT	7 ➡	◎
NATURAL LAW **JOHN HAGELIN** • PRESIDENT AND **NAT GOLDHABER** • VICE PRESIDENT	8 ➡	◎
REFORM **PAT BUCHANAN** • PRESIDENT AND **EZOLA FOSTER** • VICE PRESIDENT	9 ➡	◎
SOCIALIST **DAVID McREYNOLDS** • PRESIDENT AND **MARY CAL HOLLIS** • VICE PRESIDENT	10 ➡	◎
CONSTITUTION **HOWARD PHILLIPS** • PRESIDENT AND **J. CURTIS FRAZIER** • VICE PRESIDENT	11 ➡	◎
WORKERS WORLD **MONICA MOOREHEAD** • PRESIDENT AND **GLORIA La RIVA** • VICE PRESIDENT	12 ➡	◎
WRITE-IN CANDIDATE To vote for a write-in candidate, follow the directions on the long stub of your ballot card.		

A

OFFICIAL BALLOT, GENERAL ELECTION
PALM BEACH COUNTY, FLORIDA
NOVEMBER 7, 2000

1 - R

ELECTORS FOR PRESIDENT AND VICE PRESIDENT

(A vote for the candidates will actually be a vote for their electors.)

(Vote for Group)

TURN PAGE TO CONTINUE VOTING

William Lidwell, Kritina Holden, and Jill Butler *Universal Principles of Design*

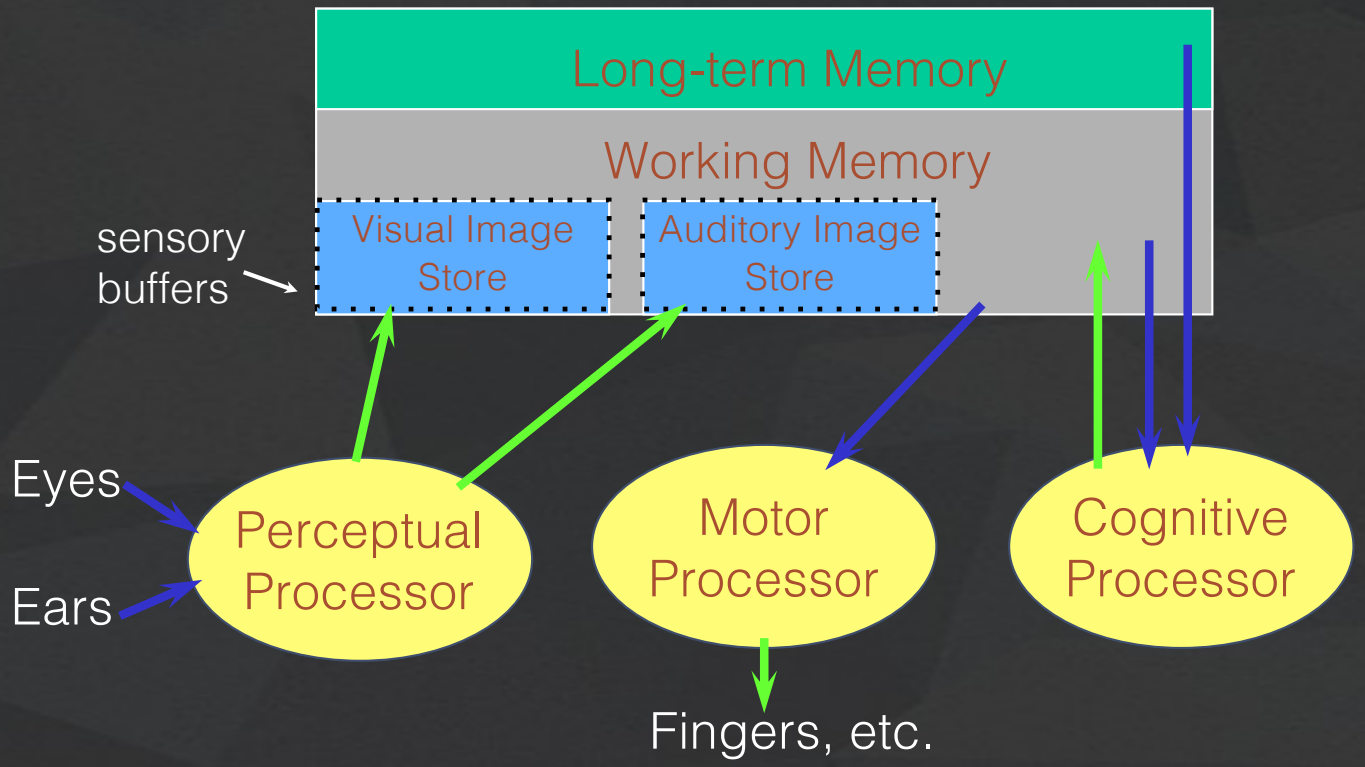
Visual Information Design

Prof. James A. Landay
Computer Science Department
Stanford University

Autumn 2023
October 23, 2023

* Based on slides by Luke Vink, Scott Klemmer, and James Landay

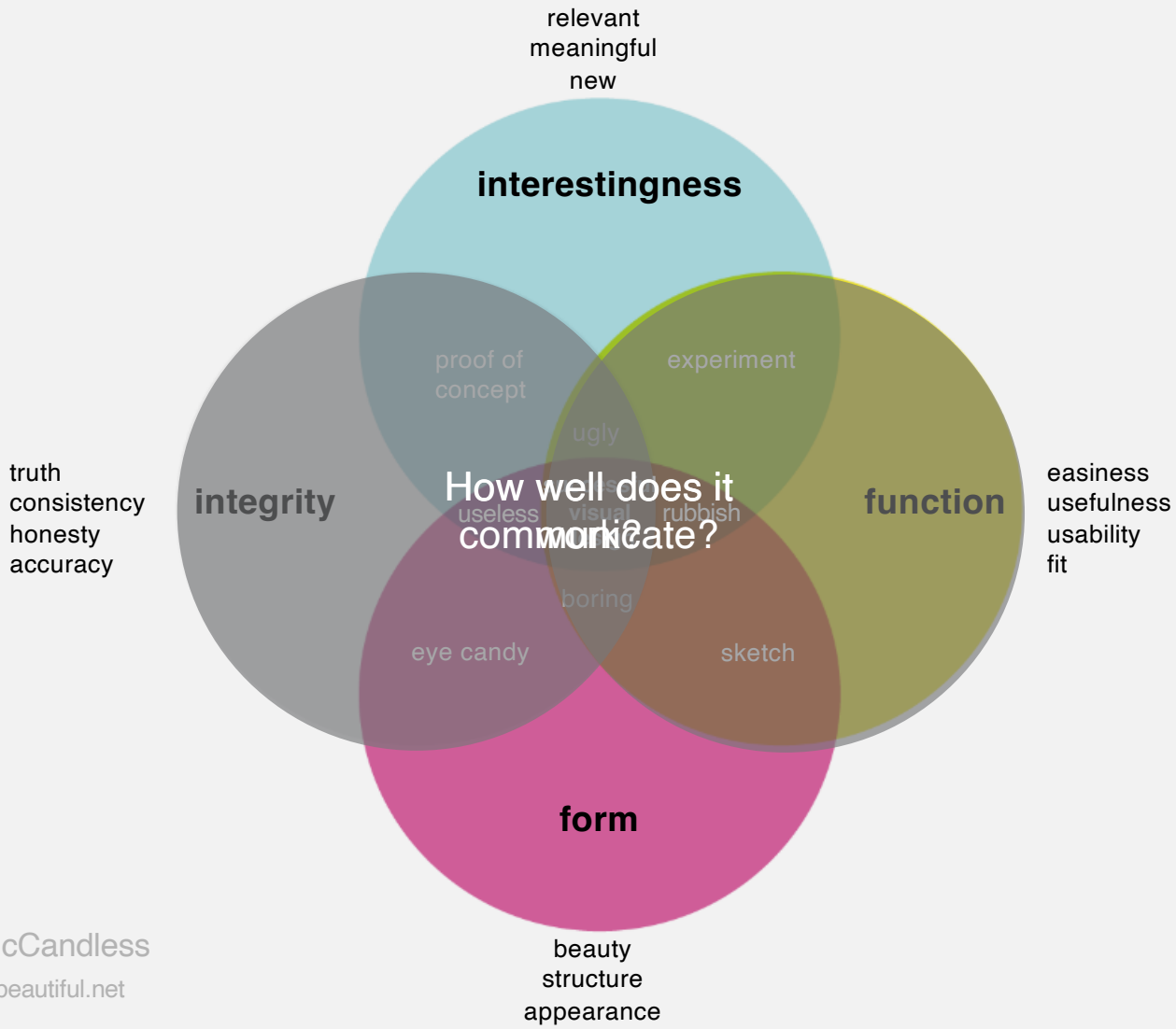
The Model Human Processor



- Parameters
  - processors cycle time (T) ~ 100 ms
  - memories capacity, decay time & type
- Use MHP to make predictions
  - min. frame rate (1/100ms)
  - Fitts' Law for time to hit target

Outline

- Good Form
  - visual hierarchy, layout, proximity, small multiples & space
  - typography, grids & icons
- Team Break
- Color
- Group mood board exercise
- “Interesting Design”



Based on David McCandless

http://www.informationisbeautiful.net

The Art of Balance

Promotion & demotion of important objects

First Question for any design

- What are the most important things?

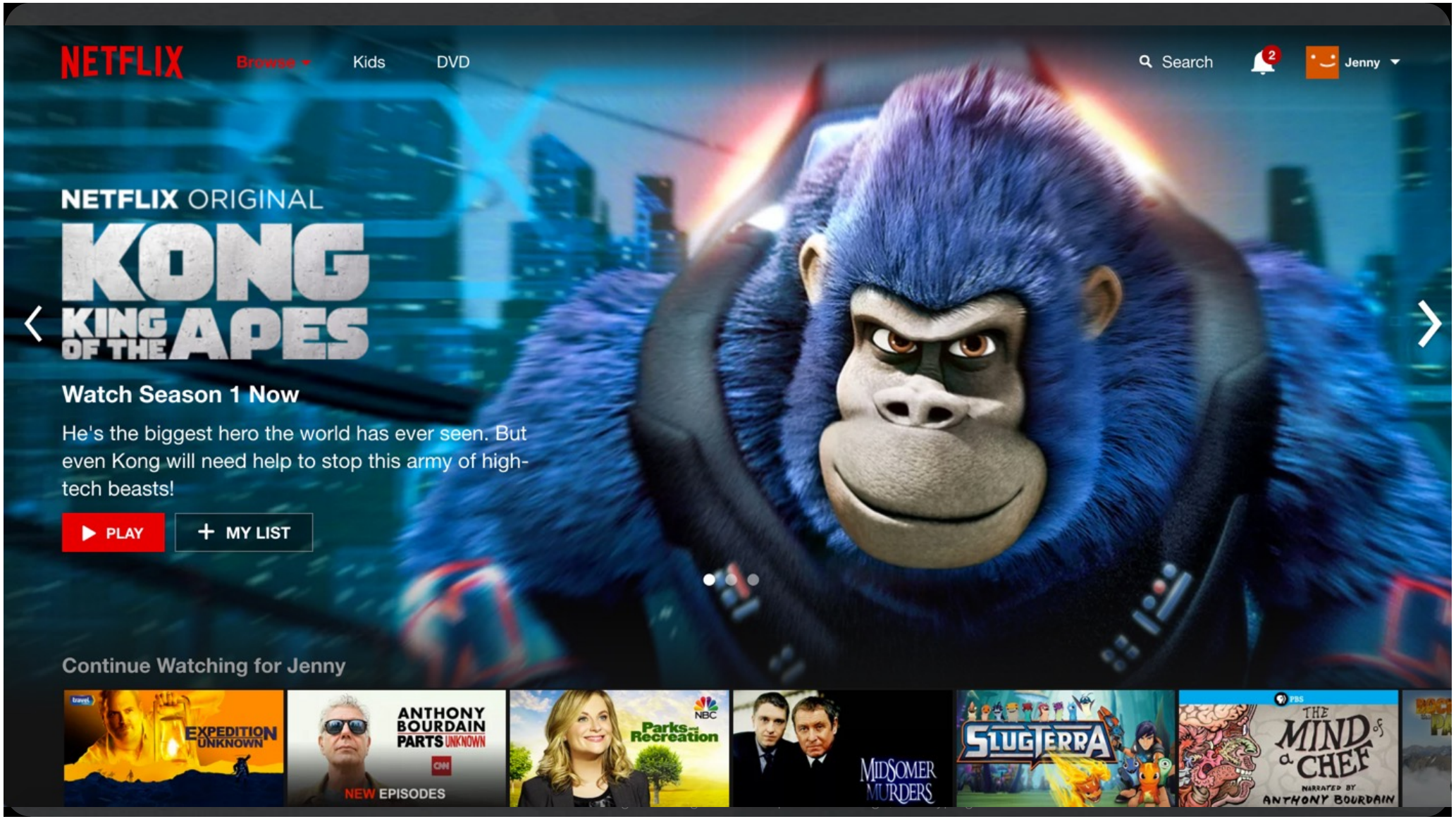
Information should be prioritized based on its importance to the user

Visual Hierarchy and Reading Order

Strong visual hierarchies guide visual & logical progression by showing what is important.

Weak visual hierarchies provide little or no guidance about what is important.

source: http://52weeksofux.com/post/443828775/visual-hierarchy


NETFLIX
Browse
Kids
DVD
Search
2
Jenny
NETFLIX ORIGINAL
KONG
KING OF THE APES
Watch Season 1 Now
He's the biggest hero the world has ever seen. But even Kong will need help to stop this army of high-tech beasts!
PLAY
+ MY LIST
Continue Watching for Jenny
EXPEDITION UNKNOWN
ANTHONY BOURDAIN PARTS UNKNOWN
NEW EPISODES
Parks and Recreation
MIDSOMER MURDERS
SLUGTERRA
THE MIND of a CHEF
NARRATED BY ANTHONY BOURDAIN

The First Read: Reading order pillars

1. size
2. color
3. layout
4. spacing
5. style

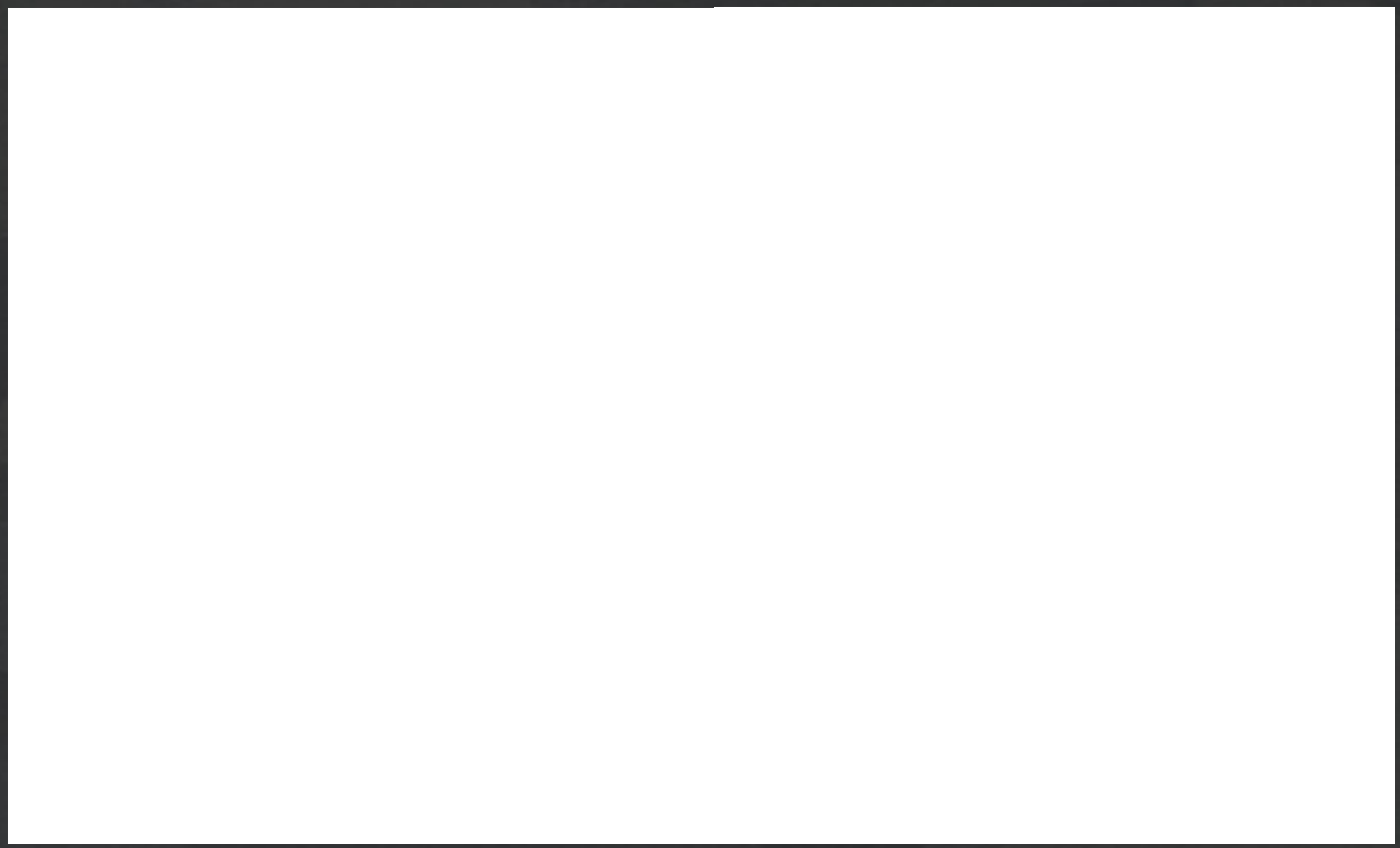
source: http://thenextweb.com/dd/2015/04/30/the-5-pillars-of-visual-hierarchy-in-web-design/#gref

Using Proximity to Indicate Relationships

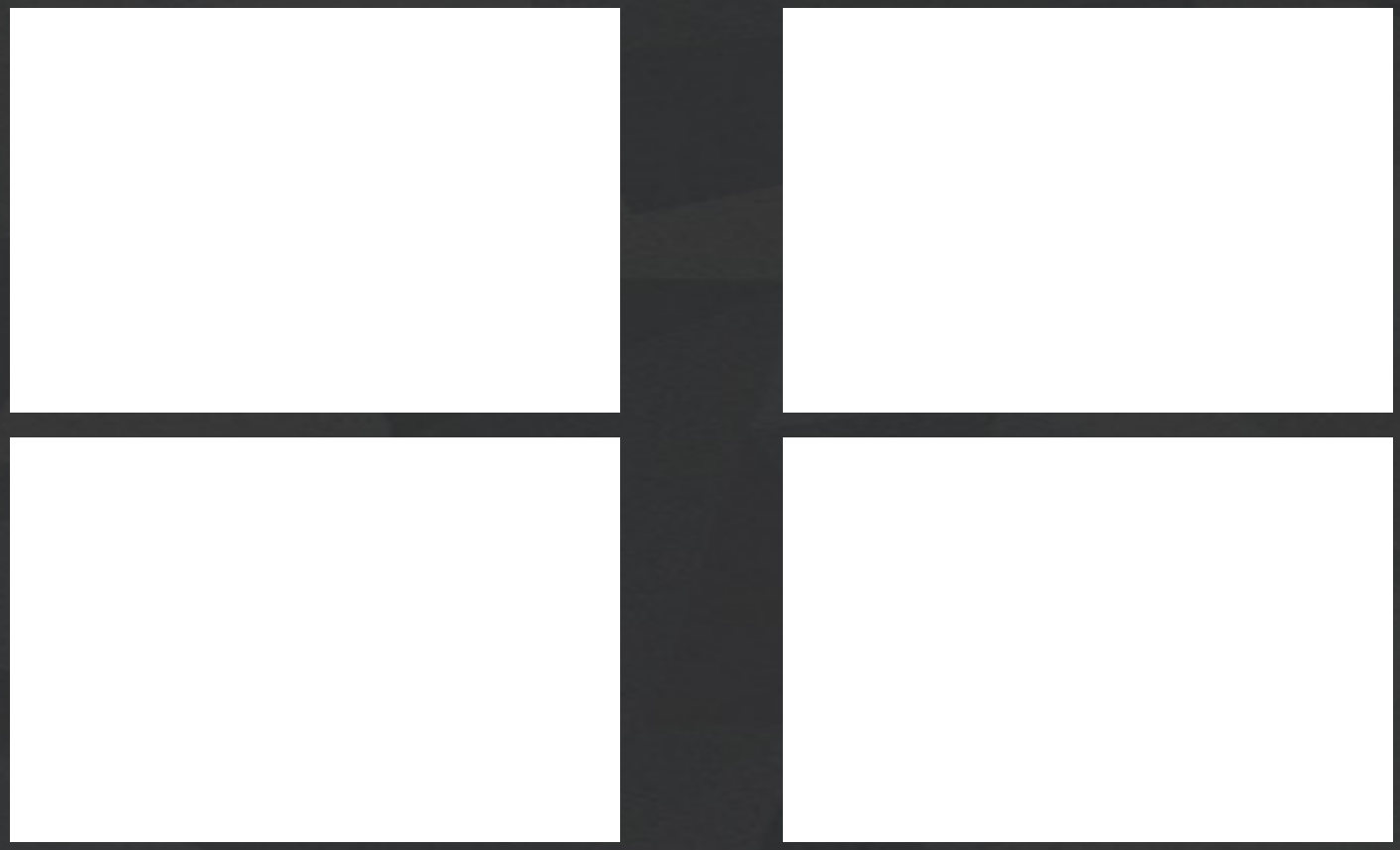
Gestalt Psychology in information design

Information blocks should be grouped together if related, but unrelated elements should be located at some distance from each other.

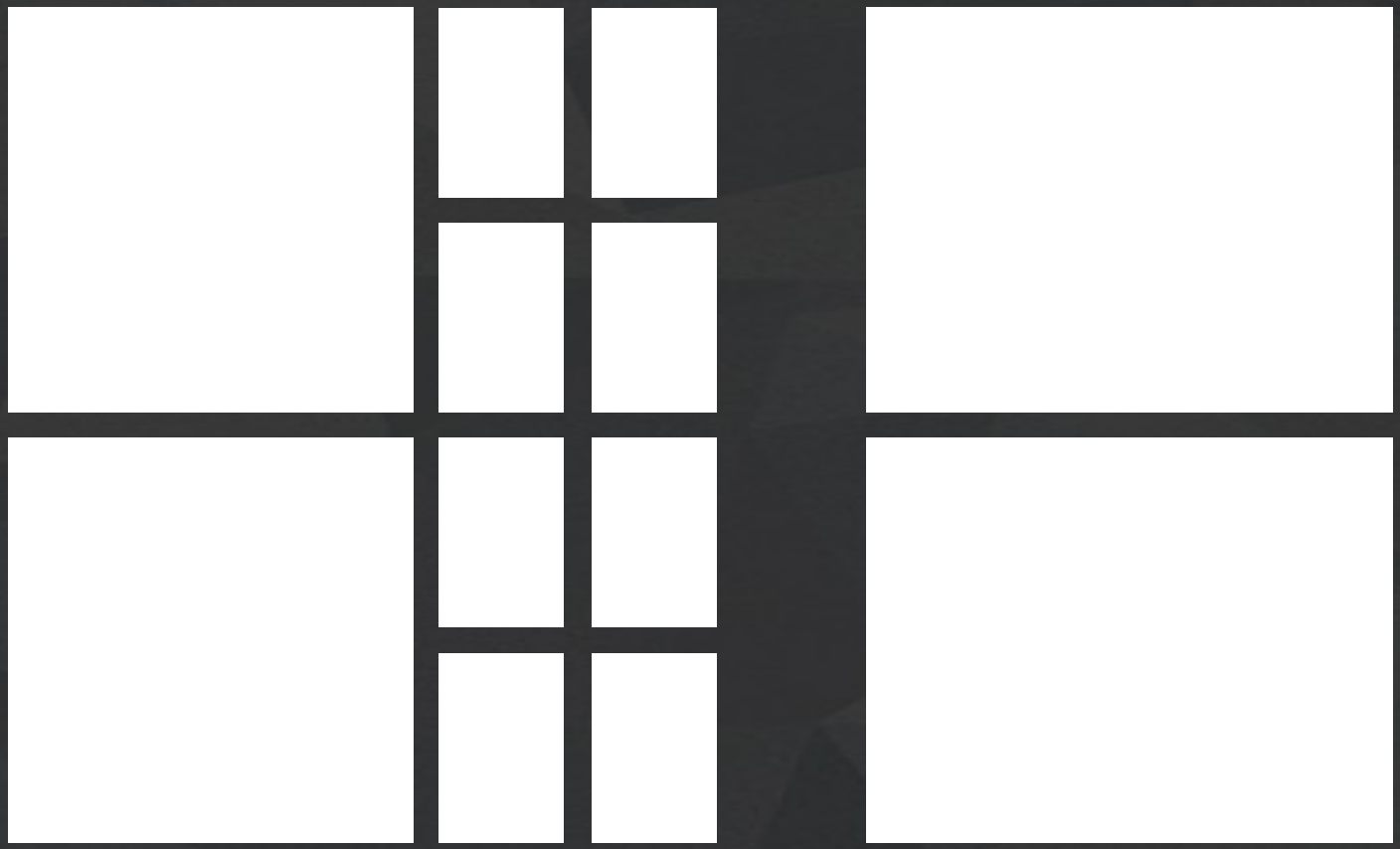
Using **Proximity** to Indicate Relationships



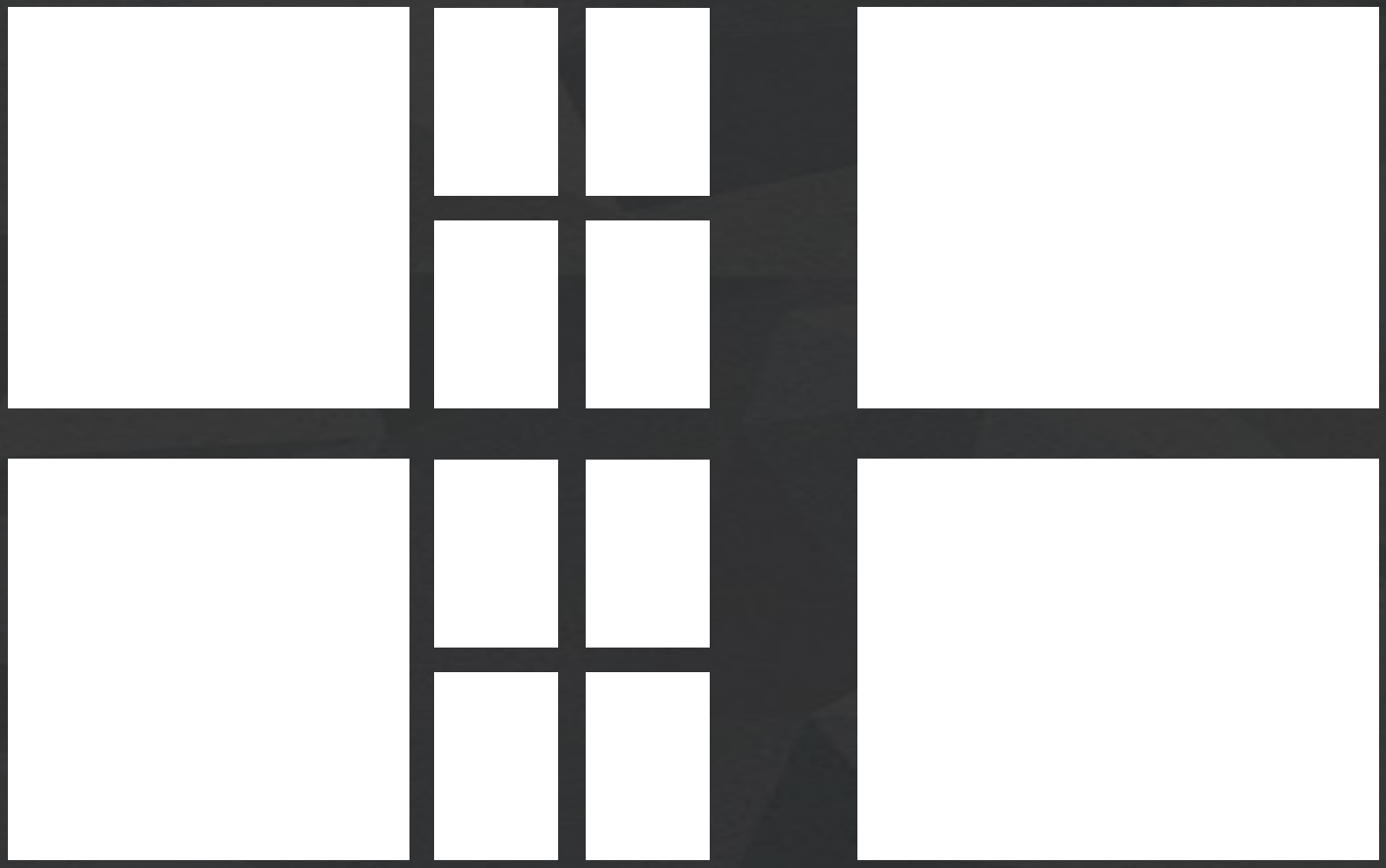
Using **Proximity** to Indicate Relationships



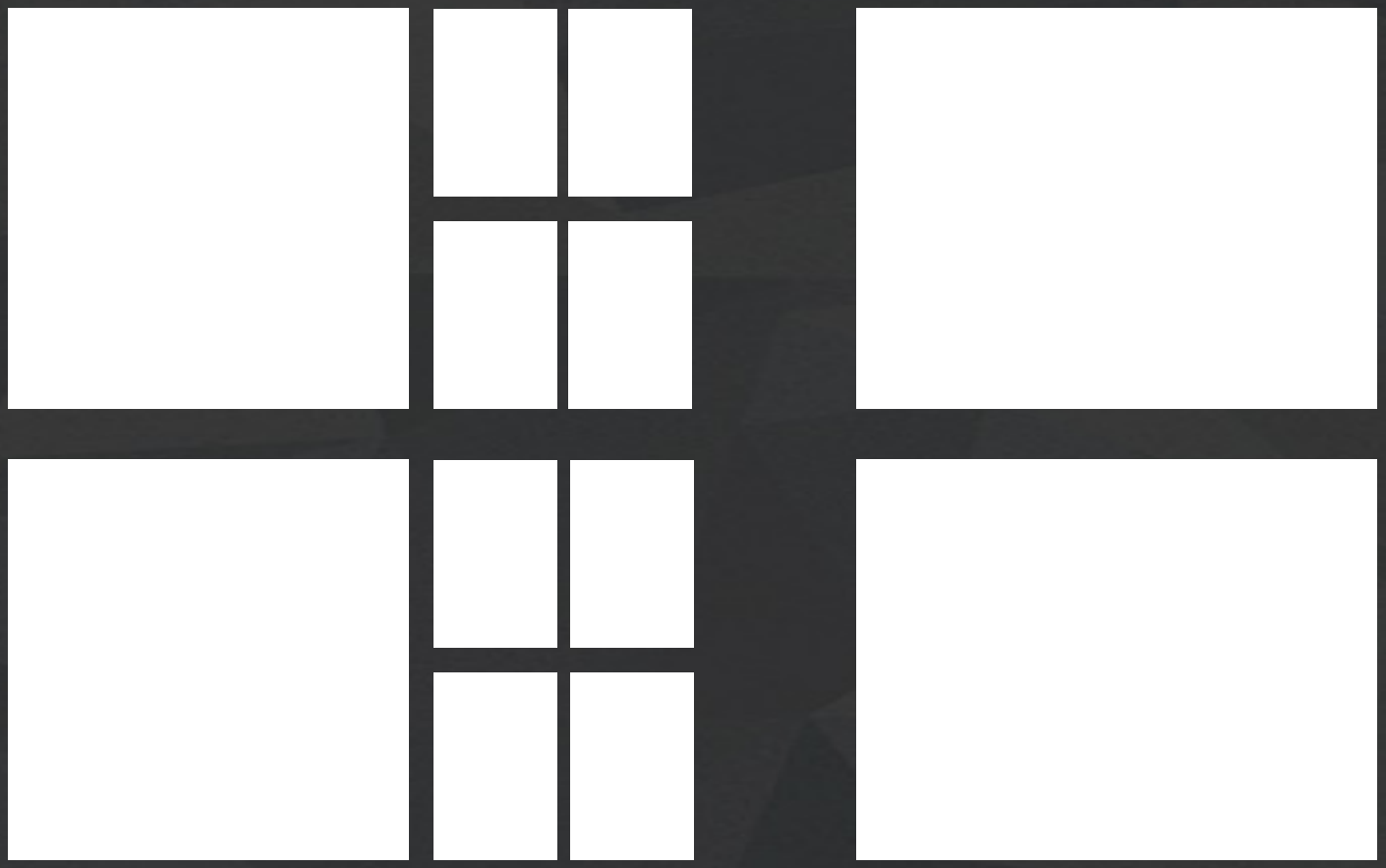
Using **Proximity** to Indicate Relationships



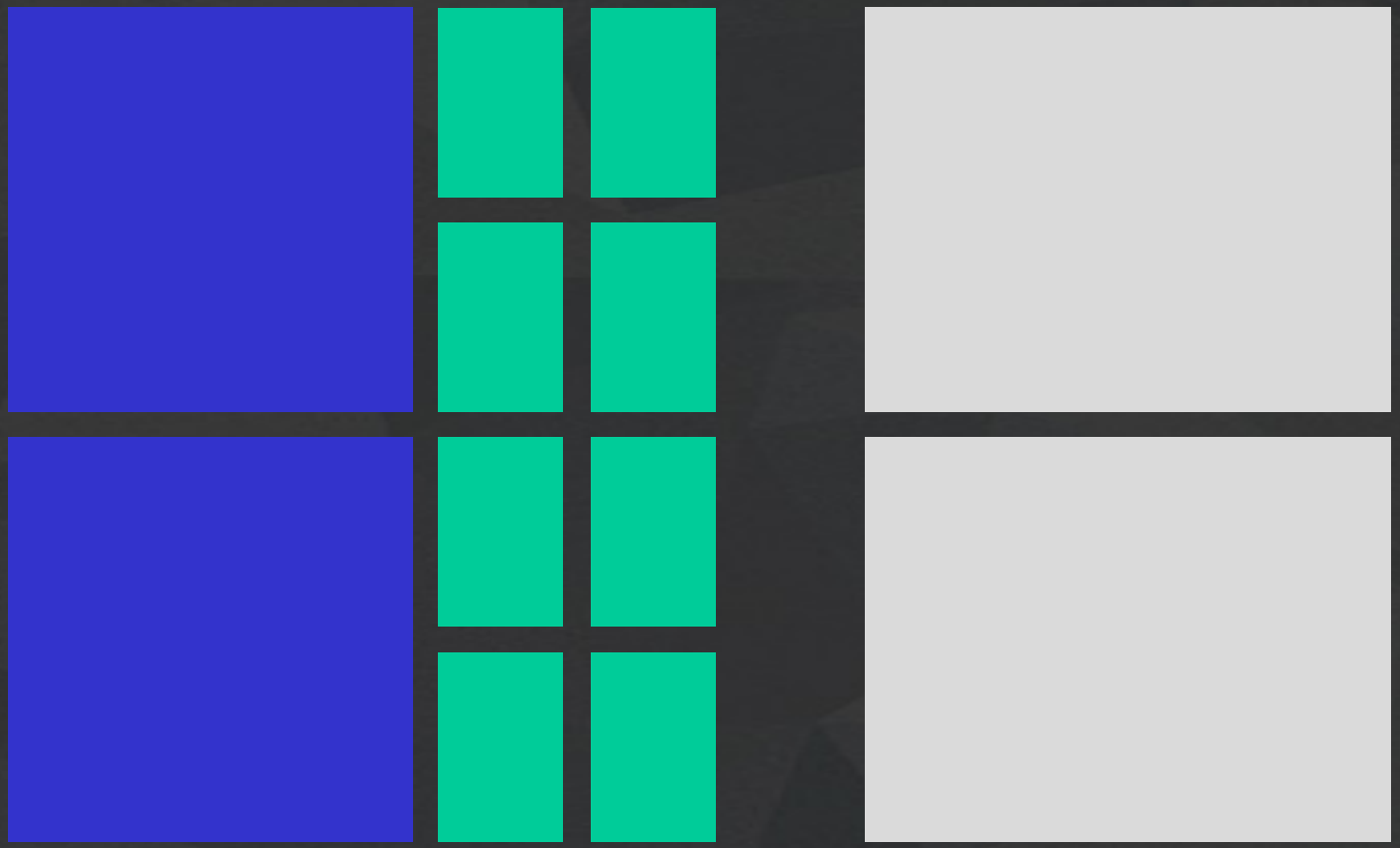
Using **Proximity** to Indicate Relationships



Using **Proximity** to Indicate Relationships



Using **Proximity** to Indicate Relationships



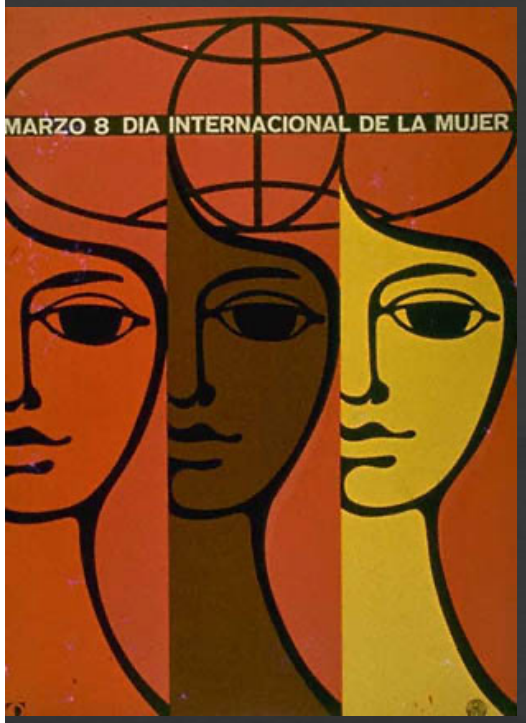
Small Multiples

- Economy of line
- Similarities enable us to notice differences

IMAGE REMOVED

International Women's Day

SMALL MULTIPLES



Echeverria, Heriberto 1971
March 8 - International Women's Day

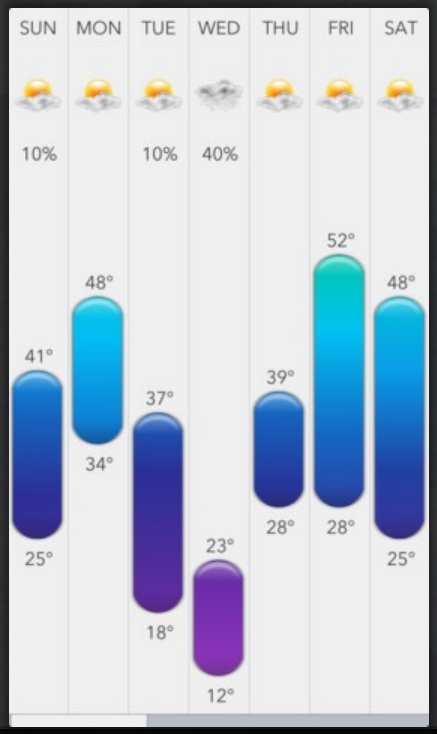
Diaz, Estela 1974
March 8 - International Women's Day

Revolucion!: Cuban Poster Art by Lincoln Cushing
http://www.amazon.com/Revolucion-Cuban-Poster-Lincoln-Cushing/dp/0811835820

Proximity & Small Multiples in Use

Today Weather

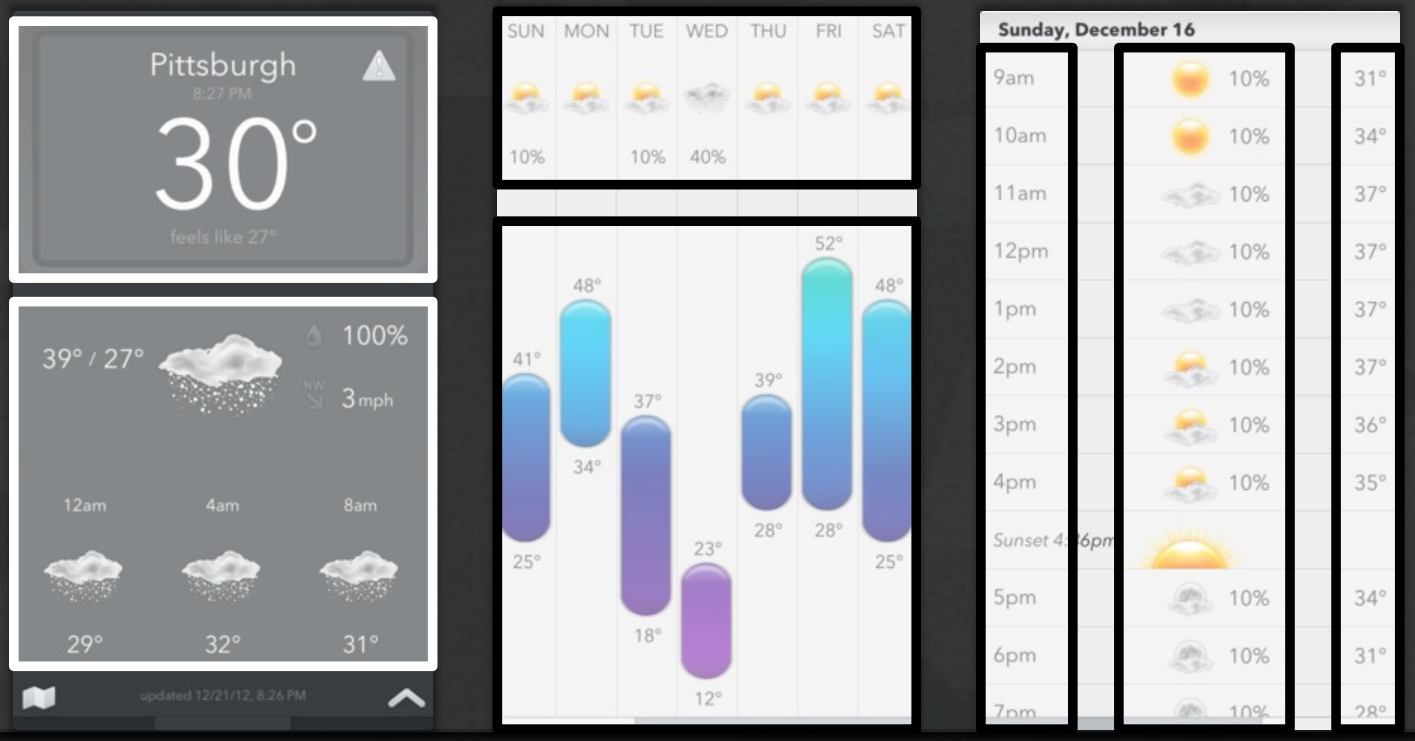
iOS App



Proximity & Small Multiples in Use

Today Weather

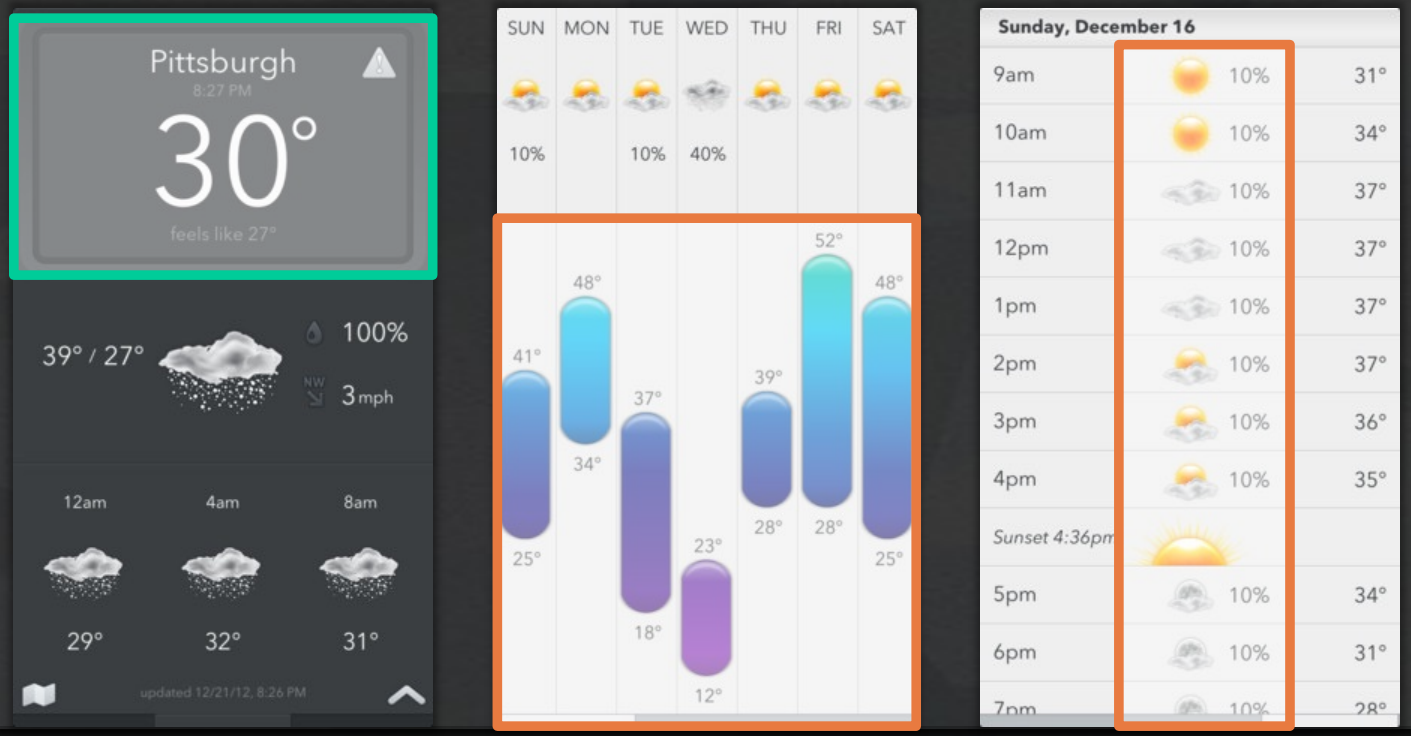
iOS App



Proximity & Small Multiples in Use

Today Weather

iOS App



Using Blank / White Space as an Object

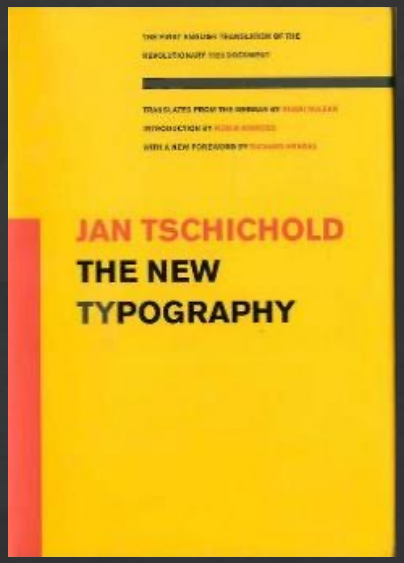
- White space can be used to suggest importance or prestige
- The more space around a group, the more valuable it should be for the user
- Think of whitespace as an “element” – consider its position

http://builtbybuffalo.com/

What Are The Important Things Here?

Jan Tschichold's Revolution

Champion of Modernist Typography



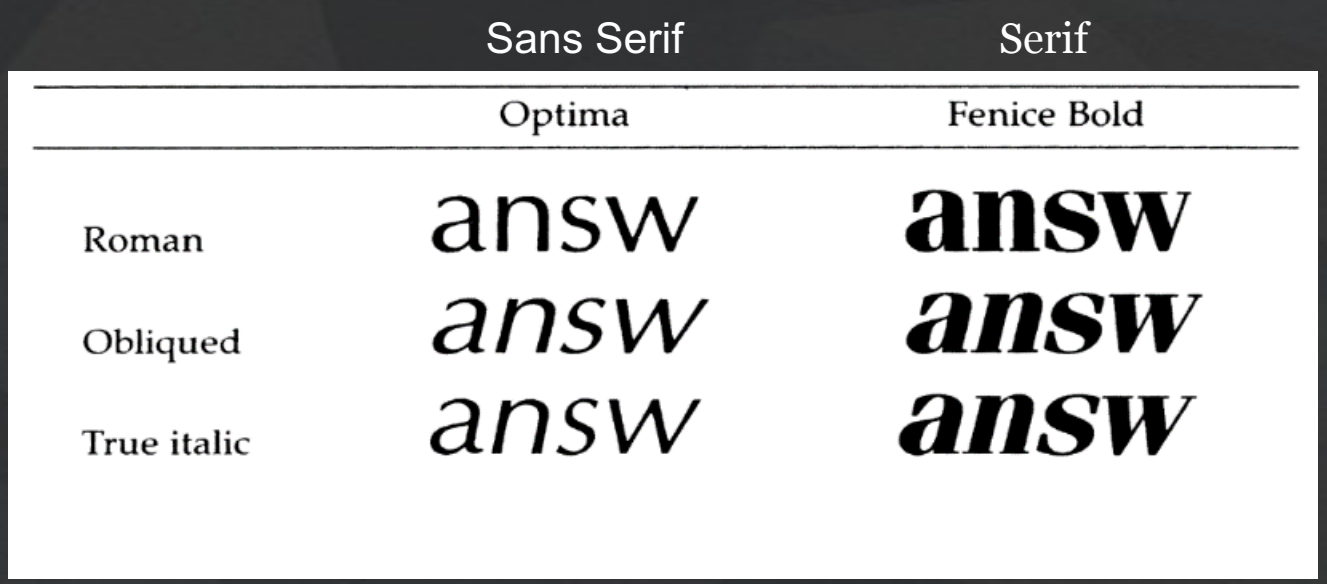
Die Neue Typographie
Berlin, 1928

Bauhaus school
Dessau, 1925-26

Type Classifications

Typeface (Arial) vs **Font** (Arial Bold)

Serifs: Structural details in letters that (may) help the reader connect them



Asymmetric Typography

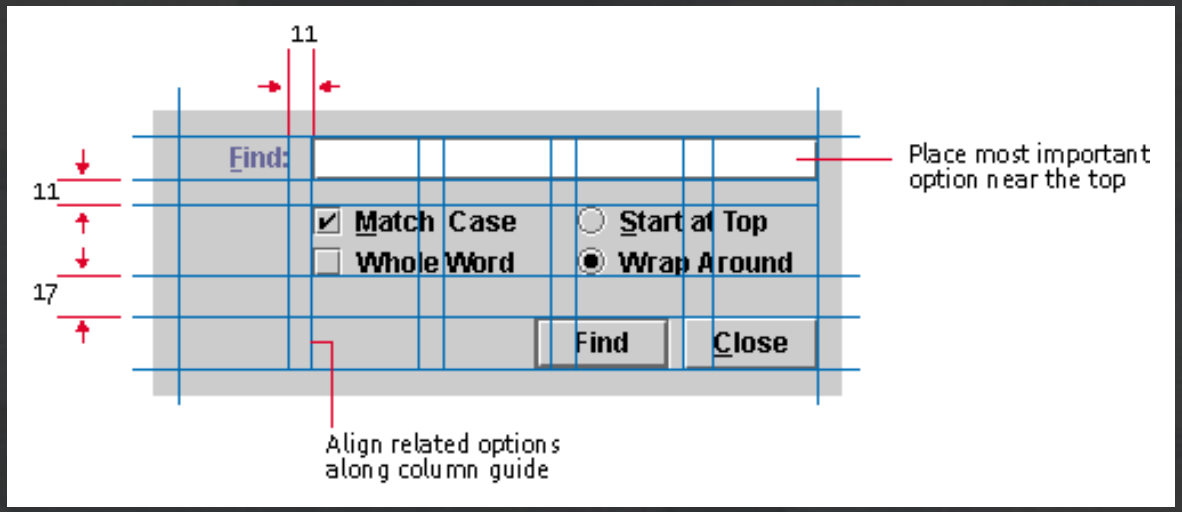
JAN TSCHICHOLD

How blocks used to be arranged in magazines. Schematic, thoughtless centering of blocks
(= ugly).

The same blocks, correctly arranged in the same type-area. Constructive, meaningful, and economical
(= beautiful).

Grid Systems

- A key pattern for implementing rationality, modernism, asymmetry
- Note that no elements are “centered”



Java Look and Feel Design Guidelines

Iconography:
Differences that Make a Difference

www.jensondesign.com/1+1=3.pdf

Administrivia

- Web site
  - must be on web site by studio next week or grade will be docked
  - problem getting a web site up, talk to your CA now
- CS 194H
  - follow-on to CS147
  - offered this Winter

Assignment Grading Buckets

✔++ **Far exceeds expectations**: Reserved for ~ the top 1-3 submissions that can be used as examples in class. This is an A+, often a perfect or > 97% score.

✔+ **Fulfills the expectations** in the spec and **some elements exceed expectations**. Strong engagement with the design process. Excellent presentation of the work. This is an A range grade (93 - 97%).

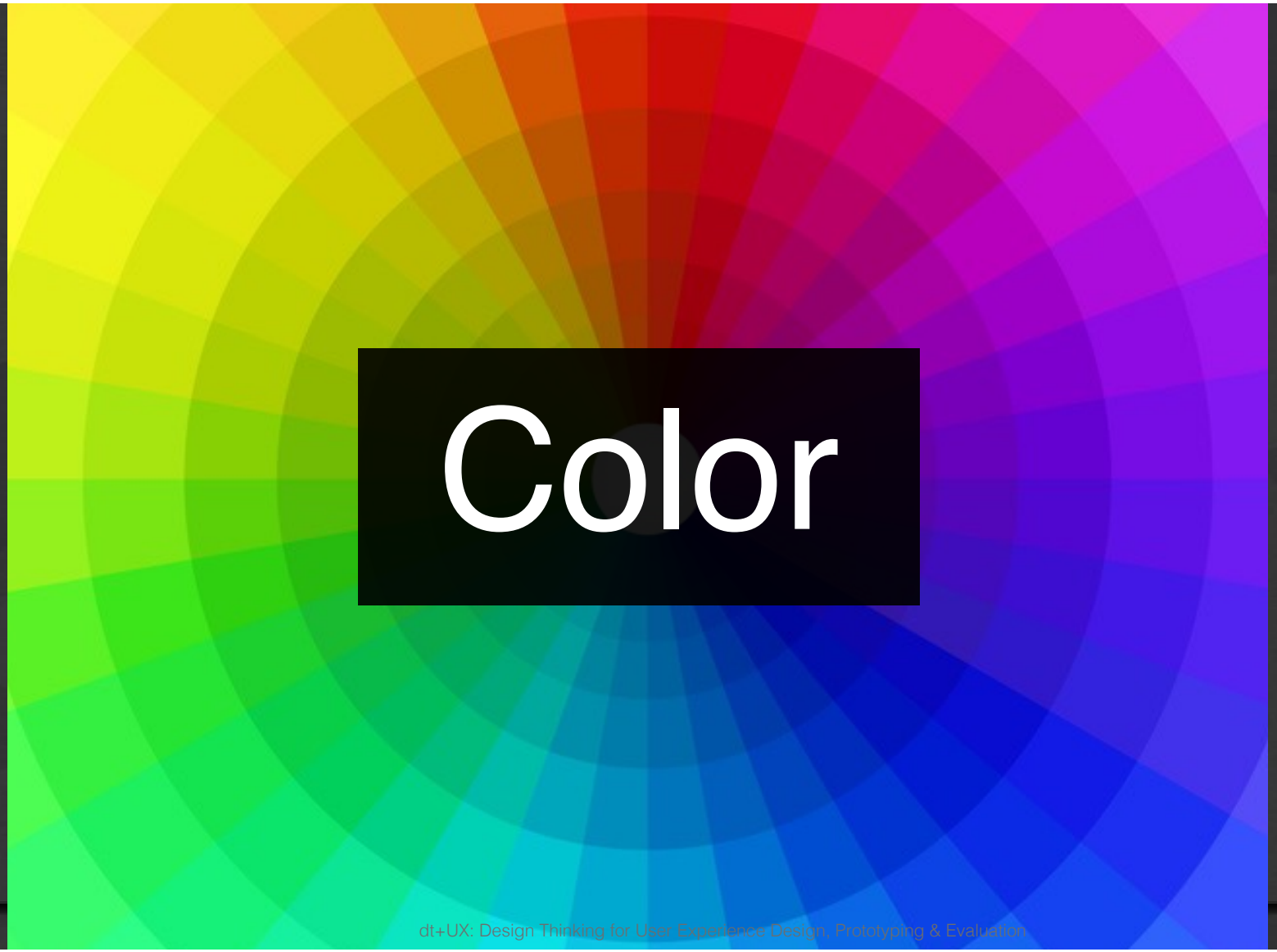
✔ **Fulfills the expectations** in the spec. Students engaged with the design process, though maybe **some small issues remain**. Presentation understandable. This is a B+/A- range grade (88 - 92%).

✔- **Relatively complete, but there are components of unsatisfactory quality**. Presentation may fall short (e.g., poor image resolution, too much text). This is a B range grade (83 - 87%).

✔- - **Incomplete or multiple parts are of unsatisfactory quality**. Shows sub-par engagement with the design process. Presentation likely falls short in many ways. This is a C+/B- range grade (78 - 82%).

- **Missing substantial assignment components and/or mostly poor quality**. Does not represent engagement with the design process. This is a C range grade or lower (< 78%).

TEAM BREAK
(FINISH LOW-FI PROTOTYPE OR SLIDES)


Color

Color Definitions (digital)

- **Hue** is gradation of color (i.e., name: “yellow”)
- **Saturation** is purity of the hue (vividness)
  - how much gray is mixed in
- **Luminance** is the brightness in an image

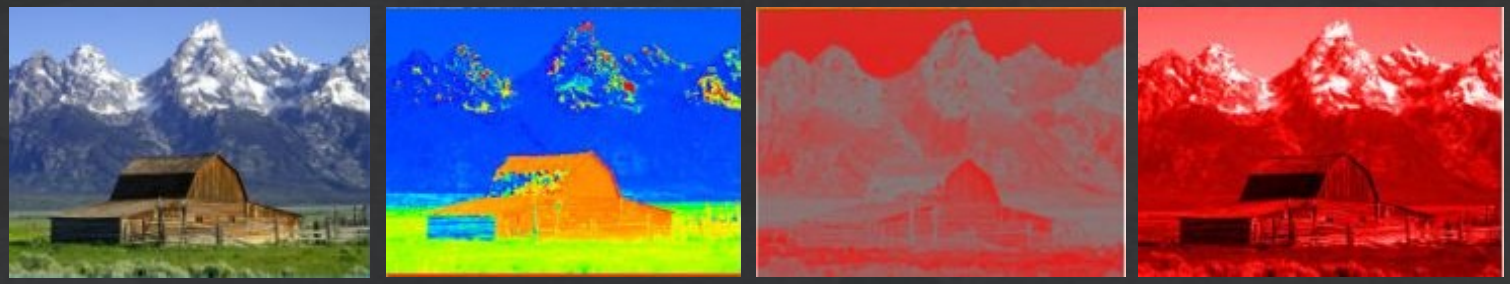


Photo Hue Saturation Luminance

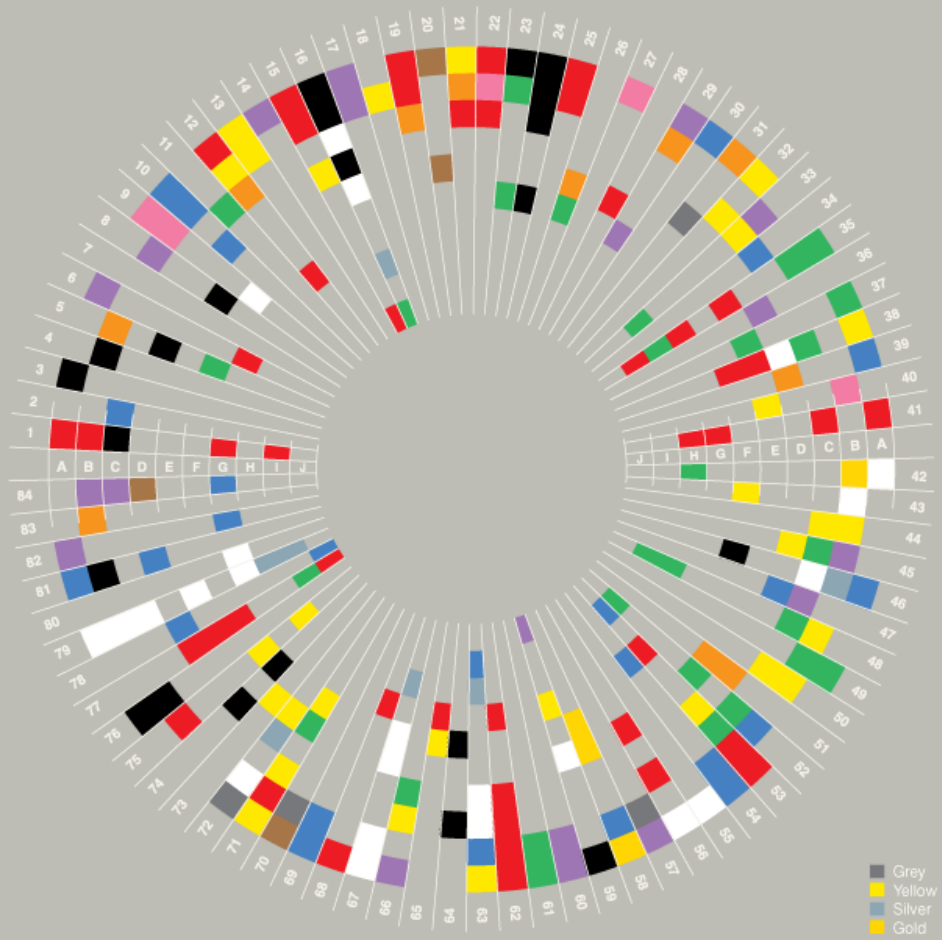
Color: Edward Tufte – by hue

IMAGE REMOVED

Color: Edward Tufte – by luminance

IMAGE REMOVED

Colours In Culture



A	Western / American	F	Asian
B	Japanese	G	Eastern European
C	Hindu	H	Muslim
D	Native American	I	African
E	Chinese	J	South American

1	Anger	43	Holiness
2	Art / Creativity	44	Illness
3	Authority	45	Insight
4	Bad Luck	46	Intelligence
5	Balance	47	Intuition
6	Beauty	48	Religion
7	Calm	49	Jealousy
8	Celebration	50	Joy
9	Children	51	Learning
10	Cold	52	Life
11	Compassion	53	Love
12	Courage	54	Loyalty
13	Cowardice	55	Luxury
14	Cruelty	56	Marriage
15	Danger	57	Modesty
16	Death	58	Money
17	Decadence	59	Mourning
18	Deceit	60	Mystery
19	Desire	61	Nature
20	Earthy	62	Passion
21	Energy	63	Peace
22	Erotic	64	Penance
23	Eternity	65	Power
24	Evil	66	Personal power
25	Excitement	67	Purity
26	Family	68	Radicalism
27	Femininity	69	Rational
28	Fertility	70	Reliable
29	Flamboyance	71	Repels Evil
30	Freedom	72	Respect
31	Friendly	73	Royalty
32	Fun	74	Self-cultivation
33	God	75	Strength
34	Gods	76	Style
35	Good Luck	77	Success
36	Gratitude	78	Trouble
37	Growth	79	Truce
38	Happiness	80	Trust
39	Healing	81	Unhappiness
40	Healthy	82	Virtue
41	Heat	83	Warmth
42	Heaven	84	Wisdom

David McCandless & AlwaysWithHonor.com // v1.0 // Apr 09 // InformationIsBeautiful.net

source: Pantone, ColorMatters & web sources

The Basics of the Color Wheel

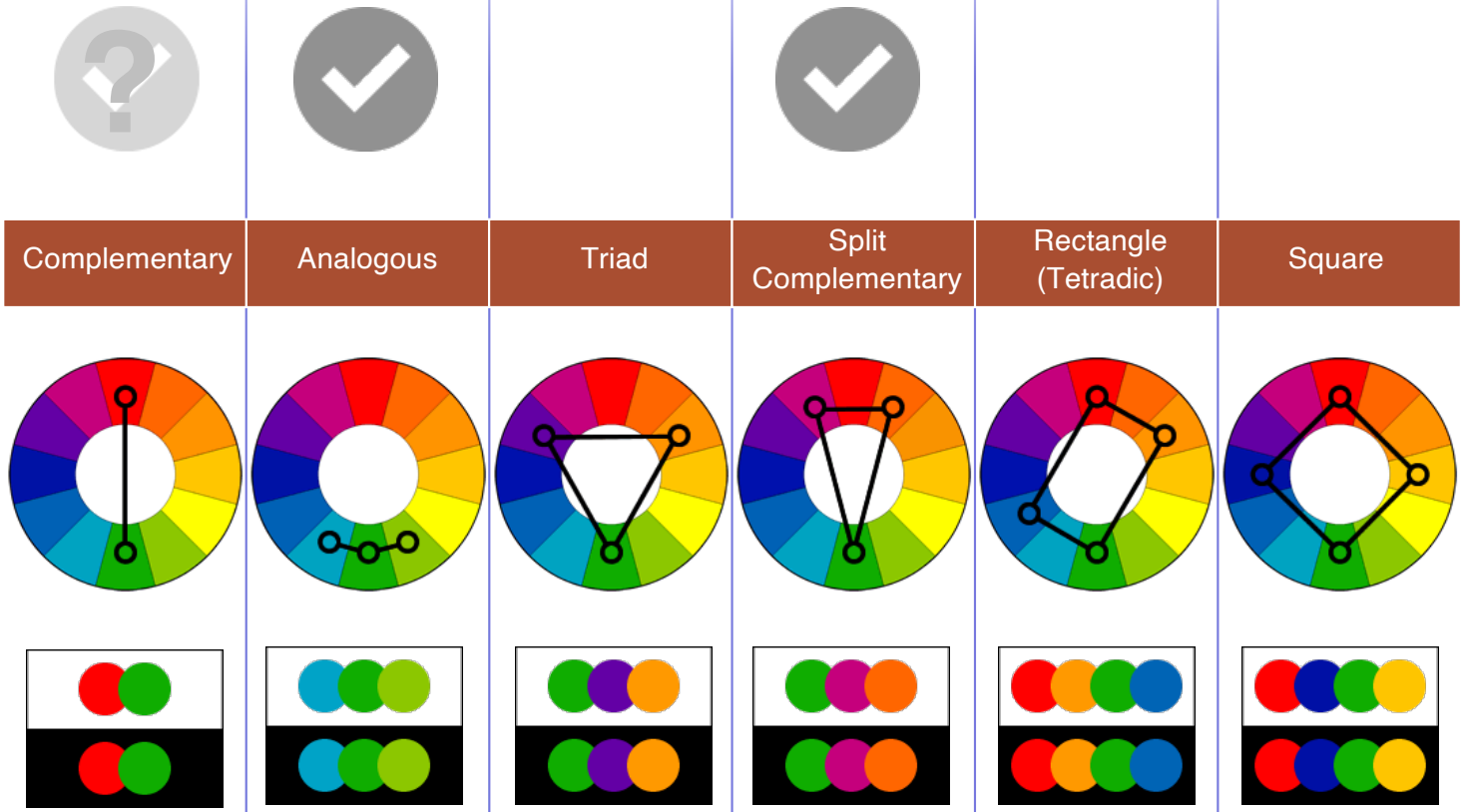
WARM

COOL

Color *Harmonies*

"A pleasing arrangement of parts, whether it be music, poetry, color, or an ice cream sundae."

Using Appropriate Color “Harmonies”



Complimentary

Not so good for text

Christmas..maybe
Everyday use...

Not so much!

Hard on the eyes

This color scheme must be managed well so it is not jarring. Bad with Text!!

Complimentary (e.g., Children's Bedroom)

Analogous

Always easy on the eyes, this type of color scheme always looks “natural”

Analogous (e.g., Beyond Oil)

Split Complimentary

Often a good choice for beginners, because it is difficult to mess up.

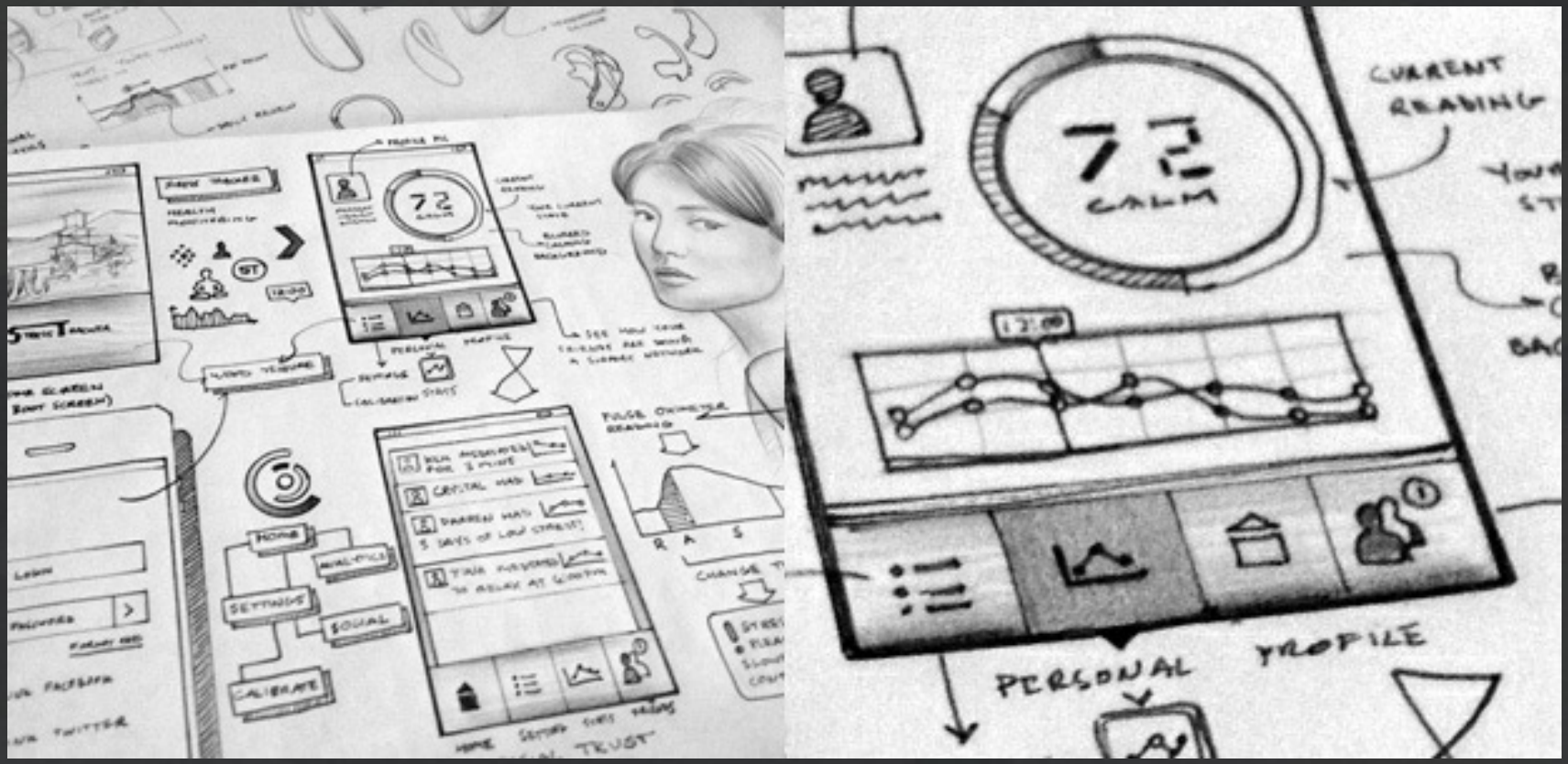
Split Complimentary

split-complementary

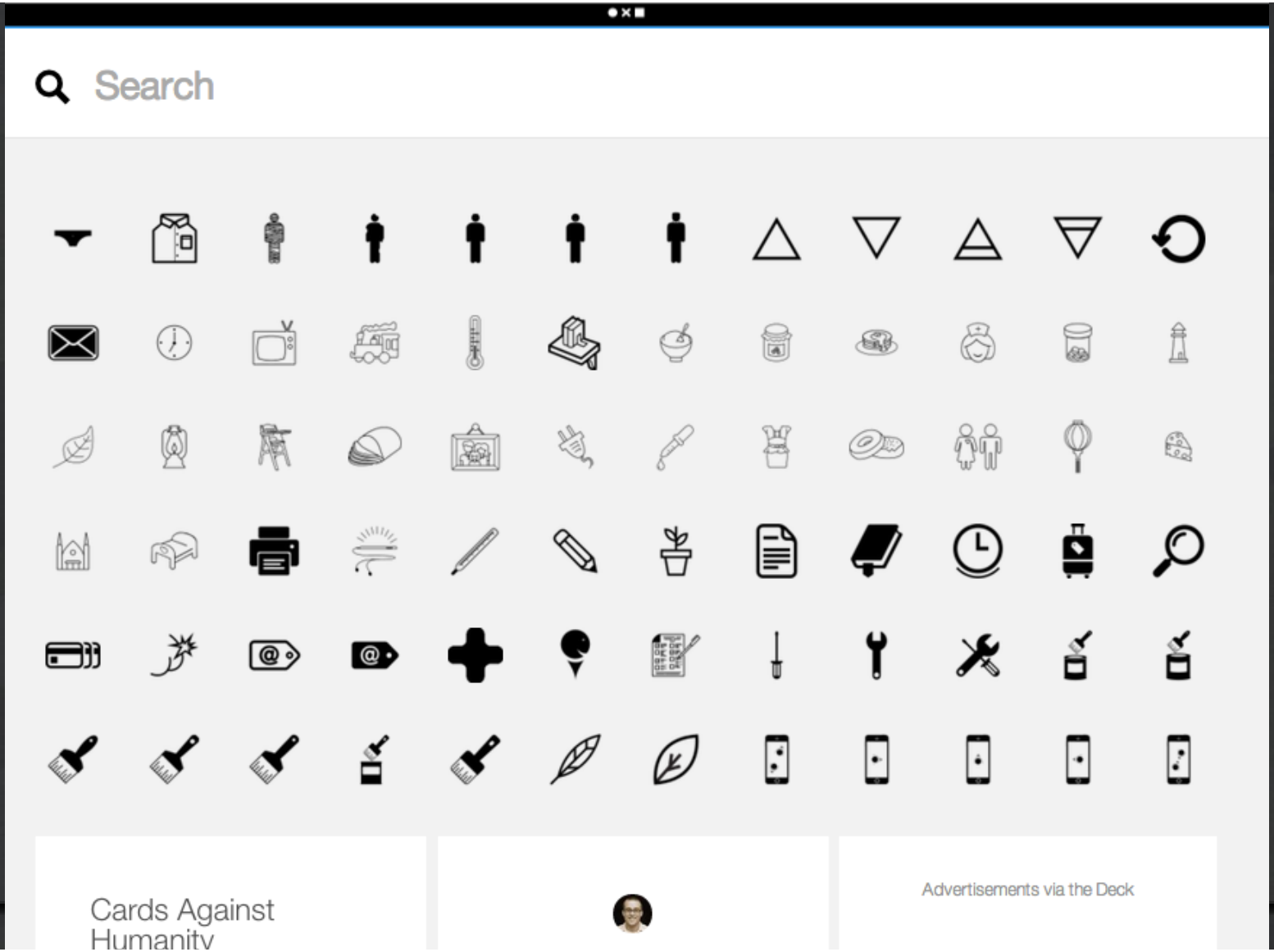
Monochromatic or Grayscale

monochromatic

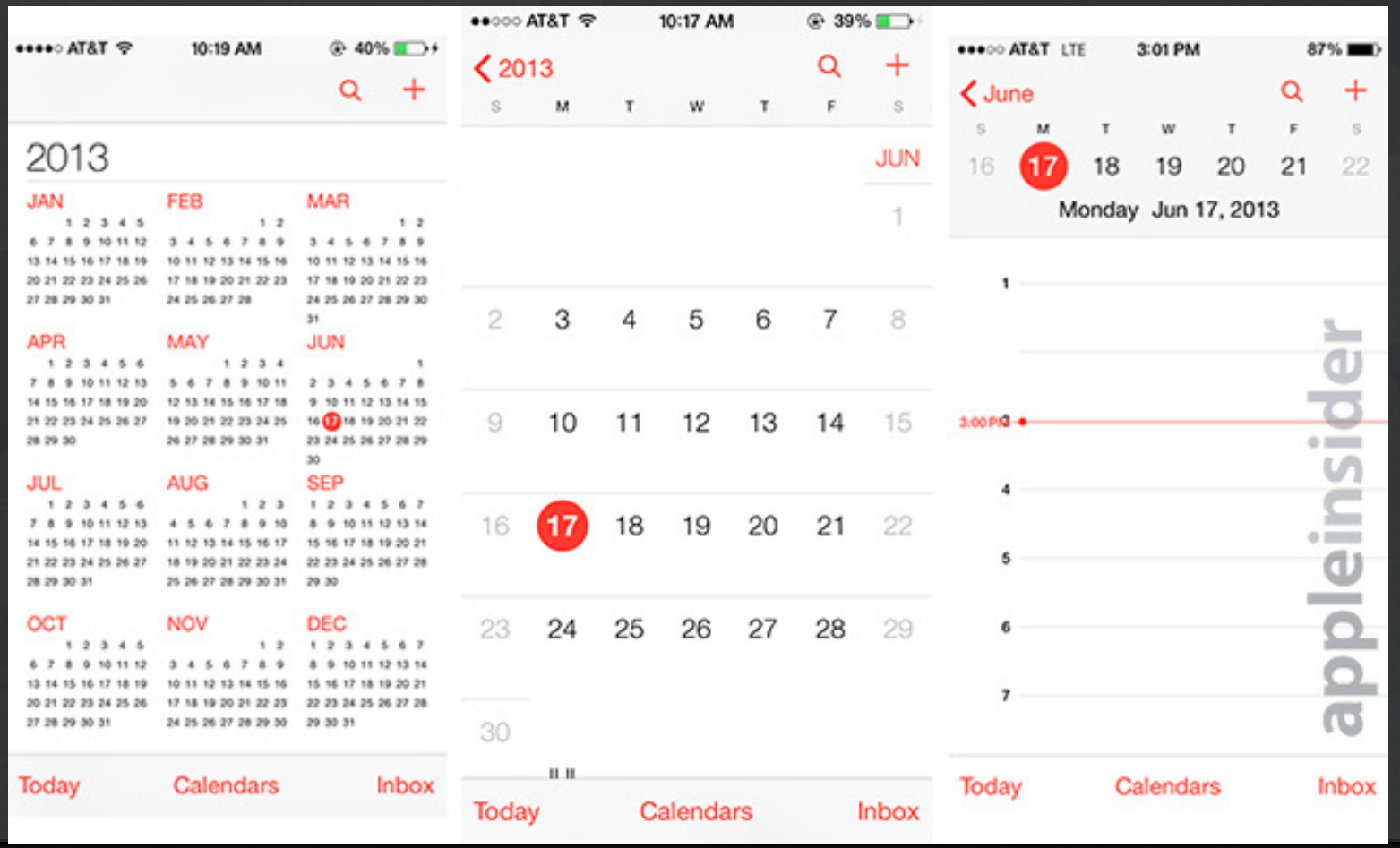
Start with Greyscale



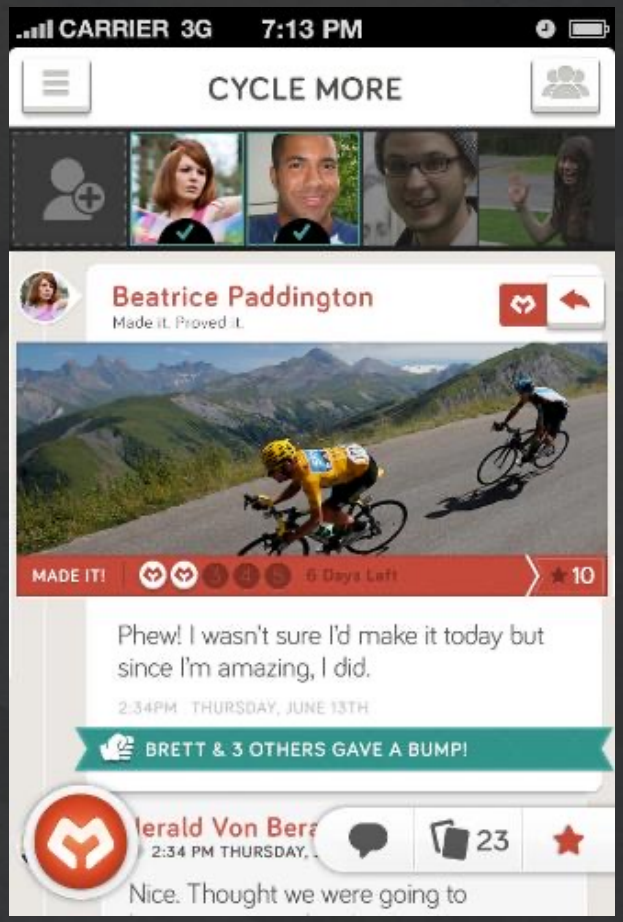
… then *accent* or *enhance* with color

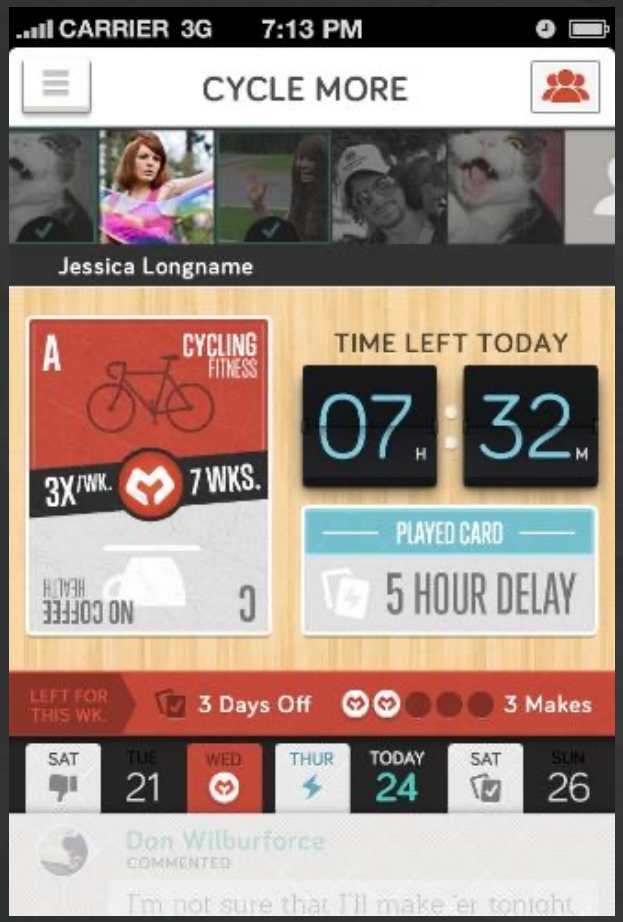

Search
Cards Against Humanity
Advertisements via the Deck

Action + Passive Colors

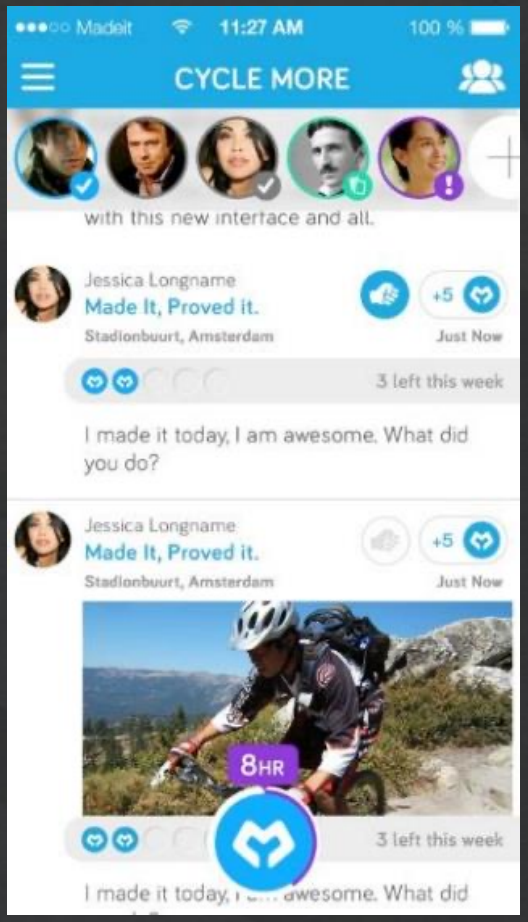


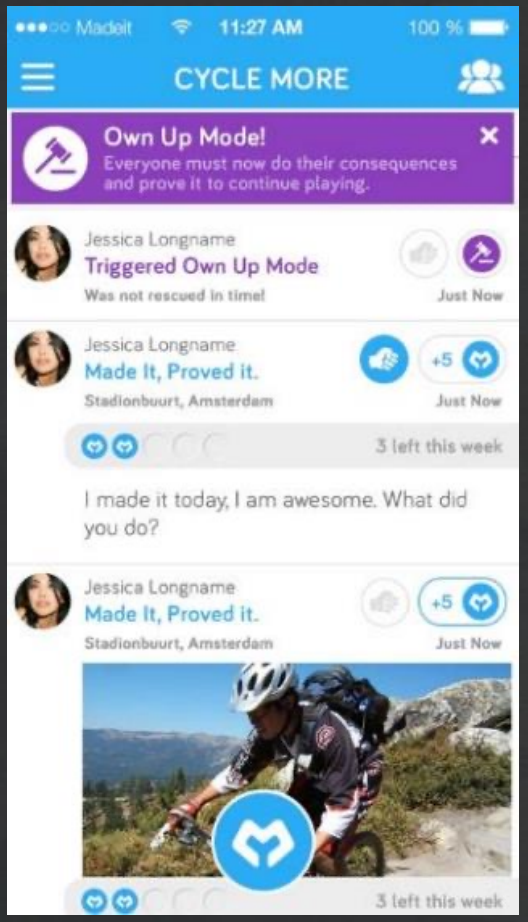
Poor Use of Color





Redesigned to Use 3 Actionable Colors

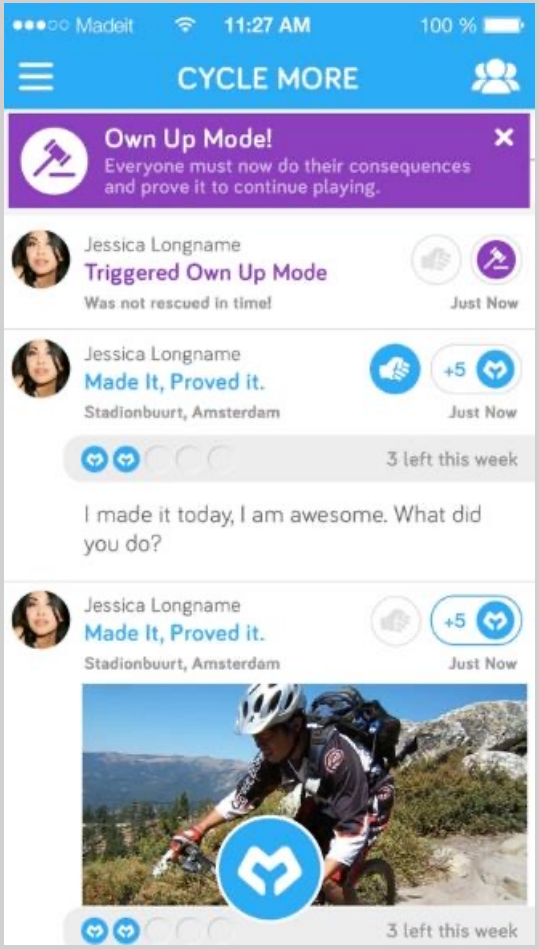




Action

Immediate

Analogous



Tools that help with color selection

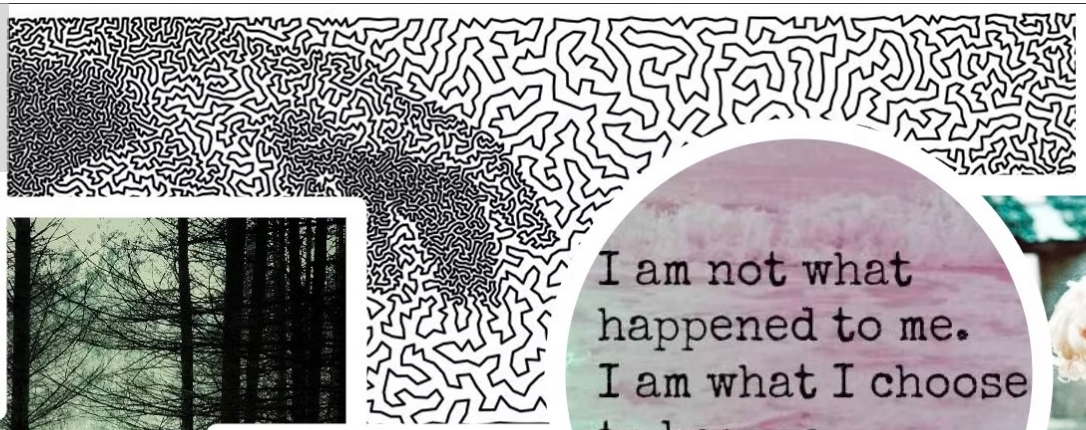
https://coolors.co/

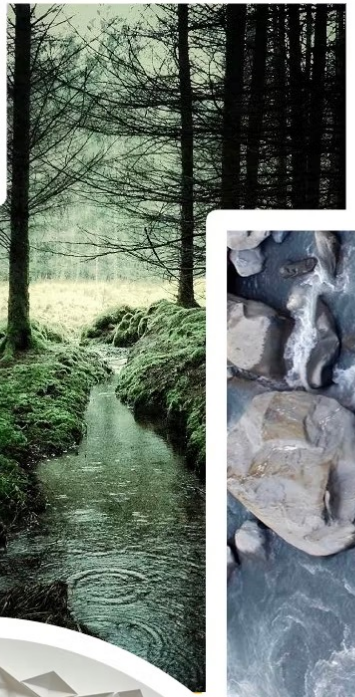
http://color.adobe.com/

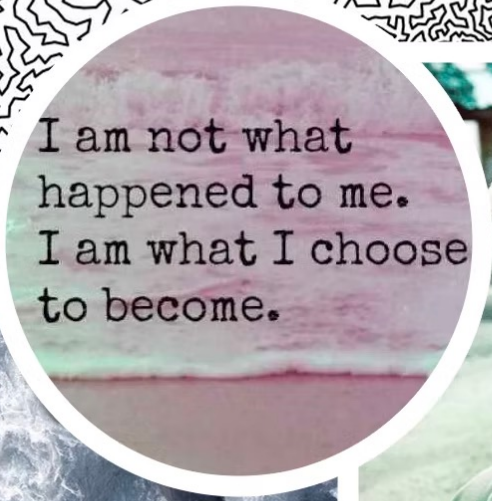
http://www.colourlovers.com

https://paletton.com/

Mood Boards







Mood Boards

there
is hope

LOREM IPSUM
DOLOR SIT AMET
AN EST NIBH ILLUM
CONCLUDATURQUE
STŌK
COLD
BREW
COFFEE
LOW & SLOW
10-HR BREW
INFOR
NAVIG

Mood Boards – Team Exercise (10 min)

- Before starting your mood board, think of 3-5 adjectives giving vibe you'd like your solution to convey to users (write them down)
- From those adjectives, have each team member search online for images to convey that tone & compile them all onto a team slide
- From the images, choose the primary & secondary colors you want to use for your medium-fi

- Copy this slide deck to your team folder
  - https://bit.ly/cs147-mood-board

Exit Ticket

https://bit.ly/CS147-2023au-exit-ticket-5-163

Visual Design that is

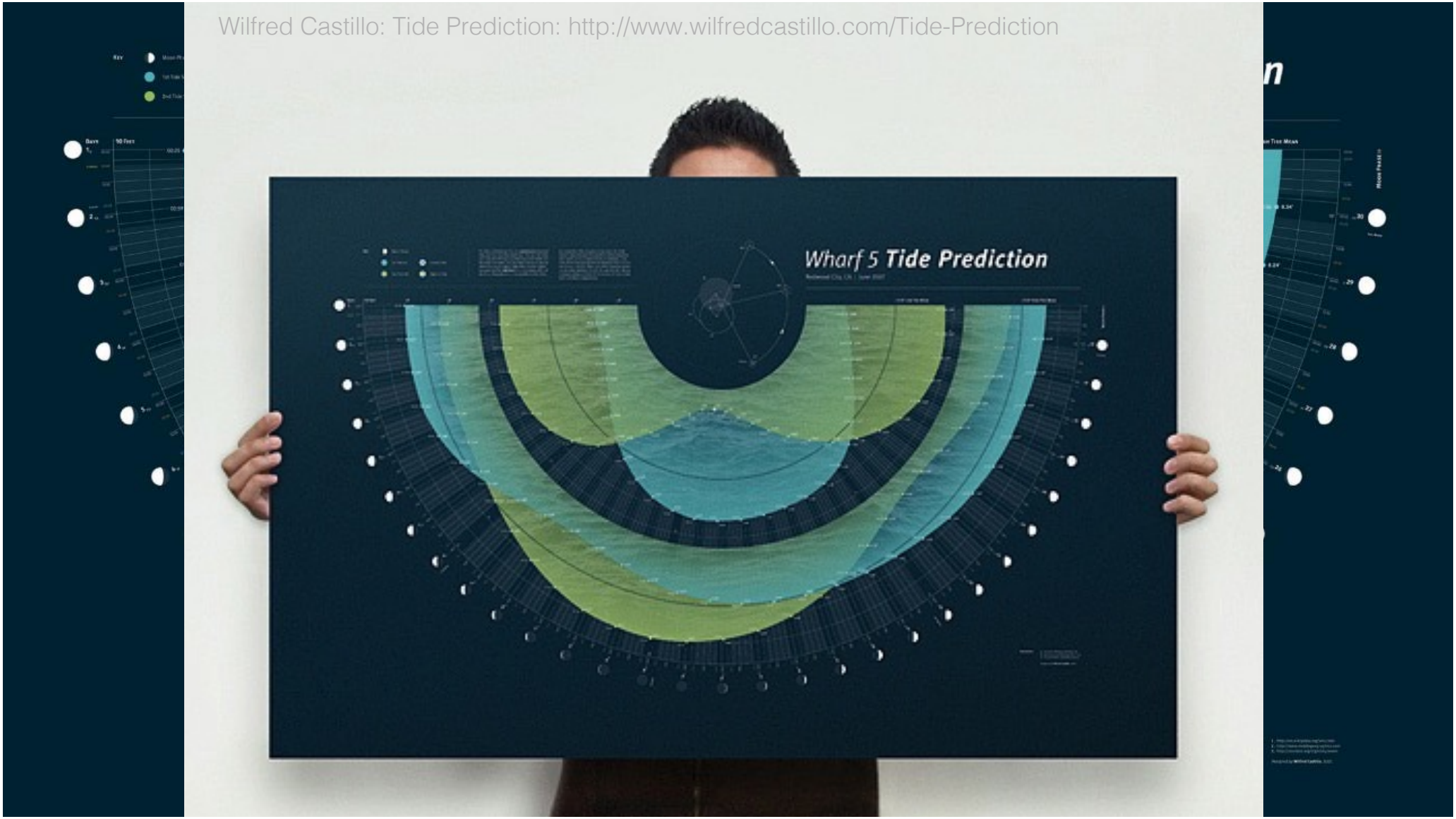
Interesting

[the wow factor]

Non Conventional Layouts

- Hard to get right & easy to overdo!
- Try new shapes
  - circular charts
  - hexagonal objects
- Like all techniques (color, etc) – restrict unconventional layouts to the most important information

Wilfred Castillo: Tide Prediction: http://www.wilfredcastillo.com/Tide-Prediction

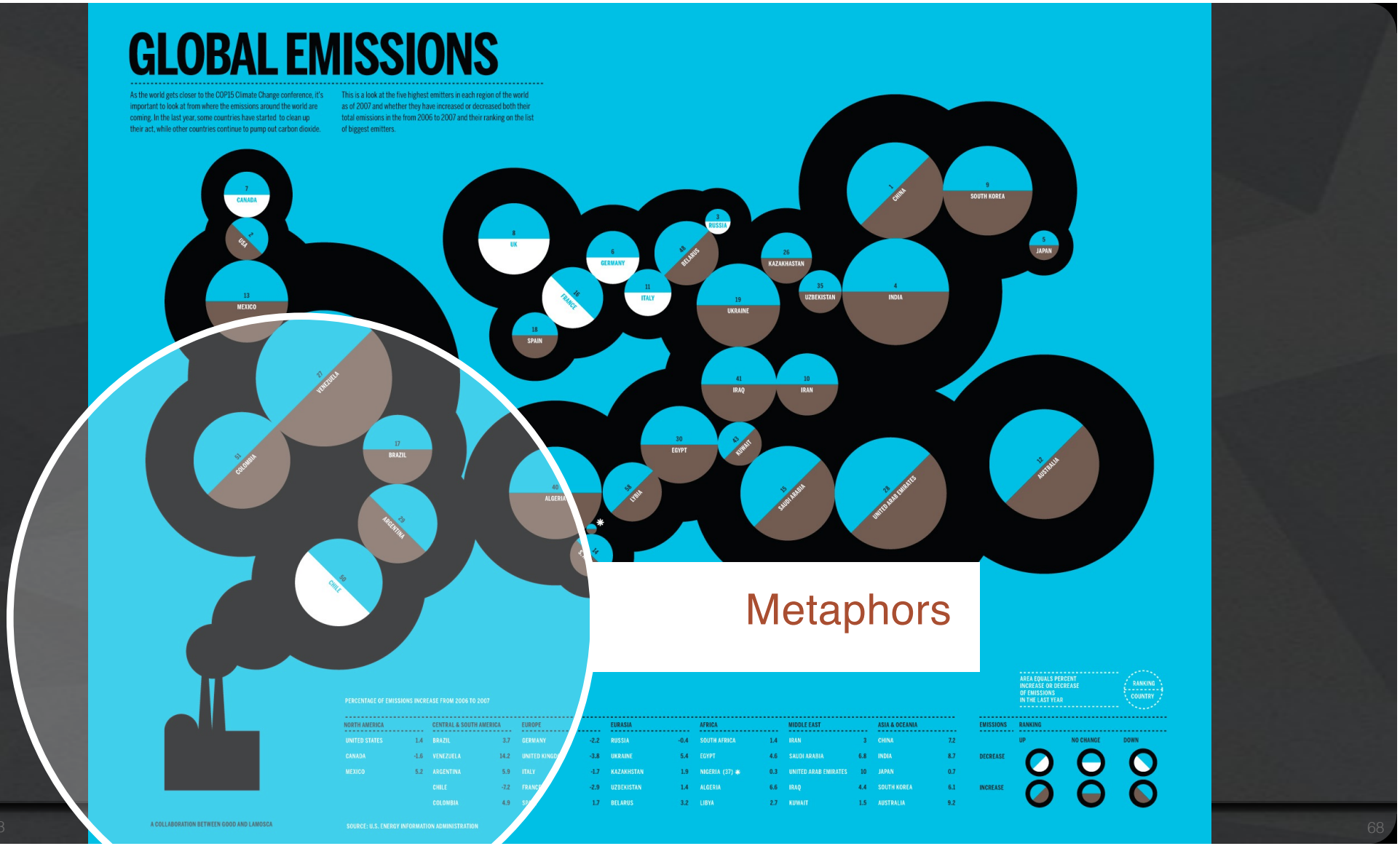


Dynamic Movement / Animation

- Hard to get right & easy to overdo!
- Animation is best used to connect information & create “flow”
- Like size, color & unusual shapes, animation draws attention to the eye & suggests importance

Metaphors (using the real world to describe info)

- Hard to get right & easy to overdo!
- Very useful to provide meaning and connect information to logic
- The more direct or specific a metaphor, the more contextually relevant it is to a generation or time


GLOBAL EMISSIONS
As the world gets closer to the COP15 Climate Change conference, it's important to look at from where the emissions around the world are coming. In the last year, some countries have started to clean up their act, while other countries continue to pump out carbon dioxide.
This is a look at the five highest emitters in each region of the world as of 2007 and whether they have increased or decreased both their total emissions in the from 2006 to 2007 and their ranking on the list of biggest emitters.
7 CANADA
2 USA
13 MEXICO
8 UK
6 GERMANY
16 FRANCE
18 SPAIN
11 ITALY
3 RUSSIA
46 BELARUS
19 UKRAINE
26 KAZAKHSTAN
35 UZBEKISTAN
1 CHINA
9 SOUTH KOREA
5 JAPAN
4 INDIA
41 IRAQ
10 IRAN
30 EGYPT
43 KUWAIT
58 LIBYA
15 SAUDI ARABIA
28 UNITED ARAB EMIRATES
12 AUSTRALIA
27 VENEZUELA
51 COLOMBIA
17 BRAZIL
29 ARGENTINA
50 CHILE
40 ALGERIA
Metaphors
PERCENTAGE OF EMISSIONS INCREASE FROM 2006 TO 2007
NORTH AMERICA
UNITED STATES 1.4
CANADA -1.6
MEXICO 5.2
CENTRAL & SOUTH AMERICA
BRAZIL 3.7
VENEZUELA 14.2
ARGENTINA 5.9
CHILE -7.2
COLOMBIA 4.9
EUROPE
GERMANY -2.2
UNITED KINGD -3.8
ITALY -1.7
FRANCE -2.9
1.7
EURASIA
RUSSIA -0.4
UKRAINE 5.4
KAZAKHSTAN 1.9
UZBEKISTAN 1.4
BELARUS 3.2
AFRICA
SOUTH AFRICA 1.4
EGYPT 4.6
NIGERIA (37) * 0.3
ALGERIA 6.6
LIBYA 2.7
MIDDLE EAST
IRAN 3
SAUDI ARABIA 6.8
UNITED ARAB EMIRATES 10
IRAQ 4.4
KUWAIT 1.5
ASIA & OCEANIA
CHINA 7.2
INDIA 8.7
JAPAN 0.7
SOUTH KOREA 6.1
AUSTRALIA 9.2
AREA EQUALS PERCENT INCREASE OR DECREASE OF EMISSIONS IN THE LAST YEAR
RANKING
COUNTRY
EMISSIONS
RANKING
UP
NO CHANGE
DOWN
DECREASE
INCREASE
A COLLABORATION BETWEEN GOOD AND LAMOSCA
SOURCE: U.S. ENERGY INFORMATION ADMINISTRATION

The best designs **balance** the techniques you have seen

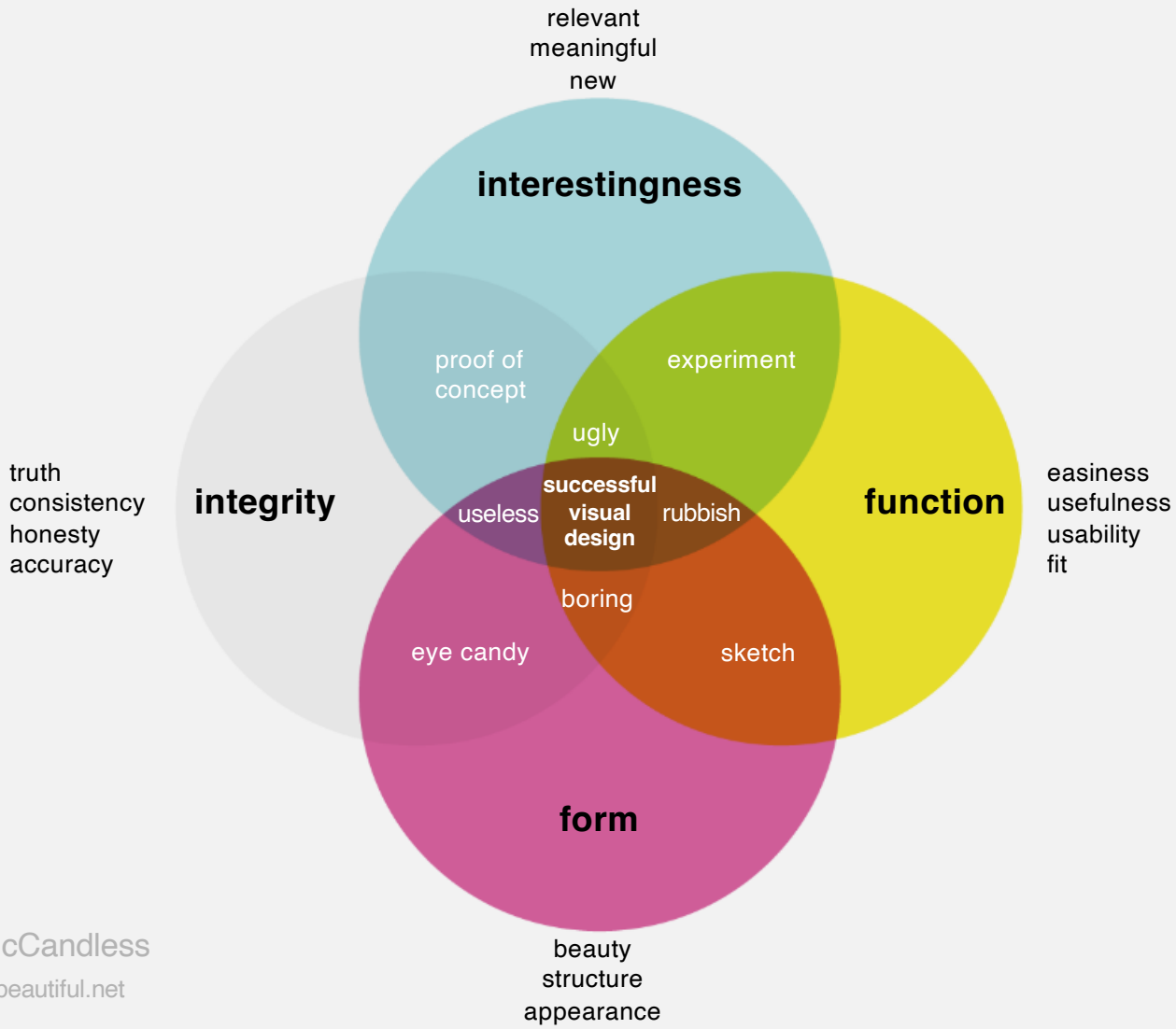
and

The **less** techniques used,
the easier it is to balance them

Overwhelming Use of Different Techniques

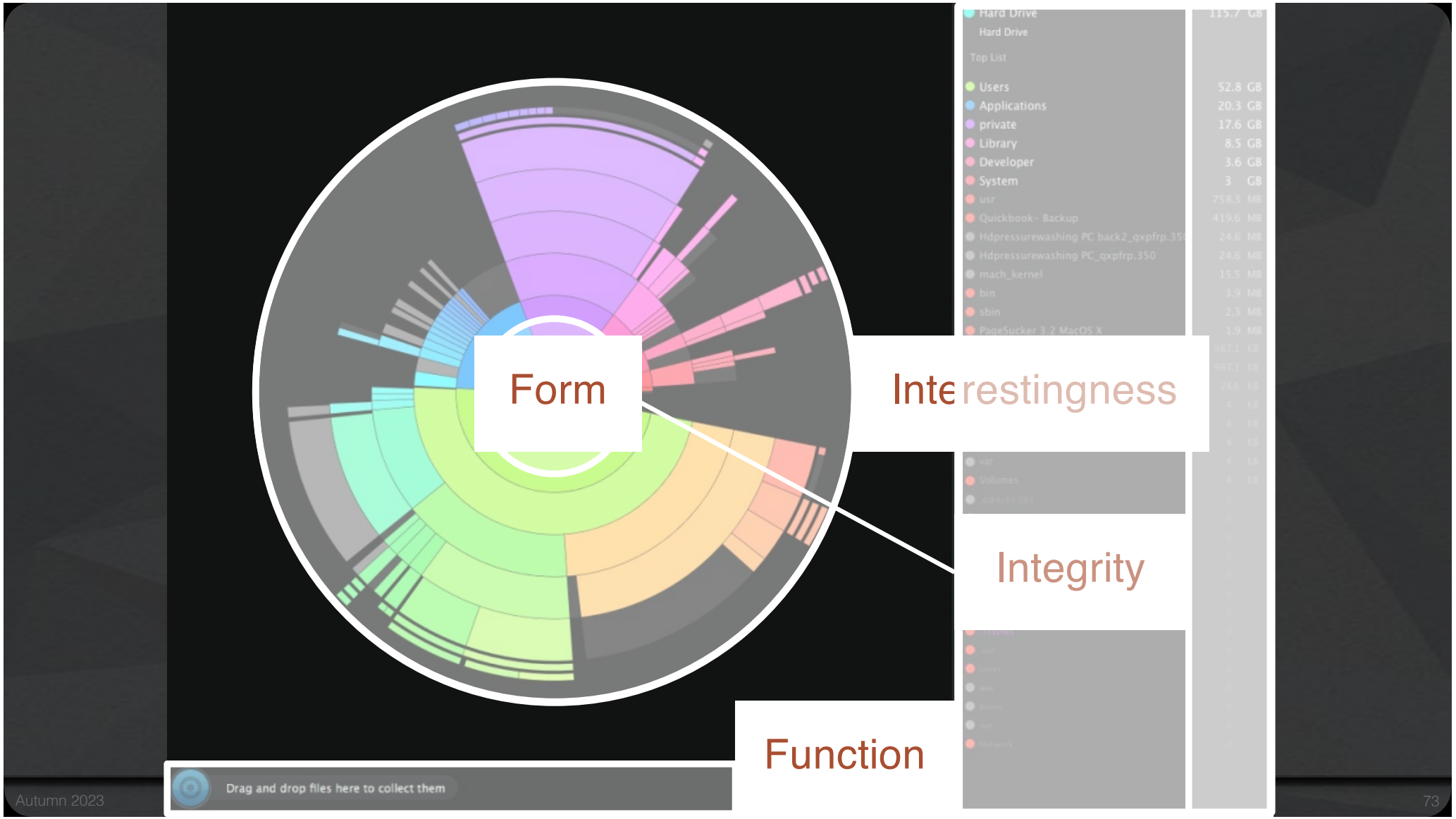
In other words,

Keep it Focused



Based on David McCandless

http://www.informationisbeautiful.net


Hard Drive
Hard Drive
Top List
Users 52.8 GB
Applications 20.3 GB
private 17.6 GB
Library 8.5 GB
Developer 3.6 GB
System 3 GB
usr 758.3 MB
Quickbook~ Backup 419.6 MB
Hdpressurewashing PC back2_qxpfrp.35 24.6 MB
Hdpressurewashing PC_qxpfrp.350 24.6 MB
mach_kernel 15.5 MB
bin 3.9 MB
sbin 2.3 MB
PageSucker 3.2 MacOS X 1.9 MB
Form
Interestingness
Integrity
Function
Drag and drop files here to collect them

Summary

- Start with context – what is the nature of the information? What is the most important?
- Design first in grayscale to focus on hierarchy
- Small changes help us see key differences
  - e.g., small multiples
- Avoid clutter, focus on the essence of your tasks
- Use color properly – not for ordering!
- Only use 1-2 colors at a time, unless absolutely necessary

Further Reading

- Kevin Mullet and Darrell Sano, *Designing Visual Interfaces*
- Edward Tufte's books and course
- Robin Williams, *The Non-Designer's Design Book*
- Typography
  - Jan Tschichold, *The New Typography*
  - Robert Bringhurst, *The Elements of Typographic Style*
- Typography on the web
  - http://www.adobe.com/type/
  - http://www.microsoft.com/typography/

Next Time

- Wed
  - CS 147 Film Festival
    - Come watch the best videos & vote on prizes
- Studio on Friday
  - present low-fi prototype/user study results – *key things learned*
  - work on sketching out new designs
- Mon
  - Conceptual Models & Interface Metaphors
  - Read
    - "The Psychology of Everyday Things" (Ch 1) from The Design of Everyday Things by Donald Norman