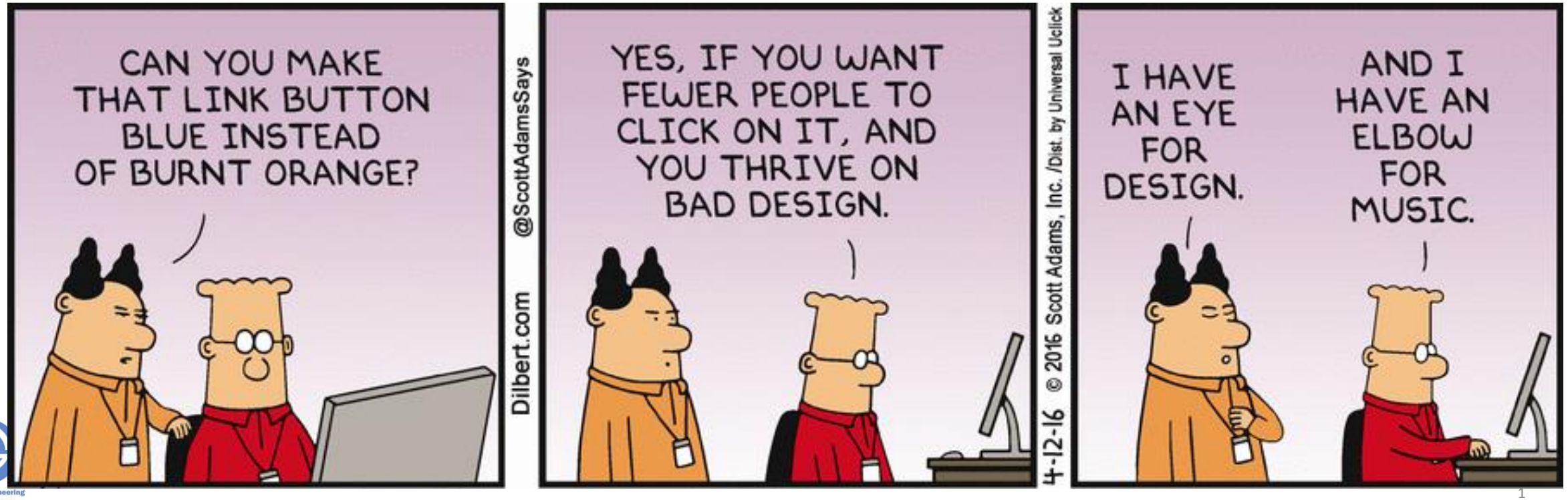
SWEN-444

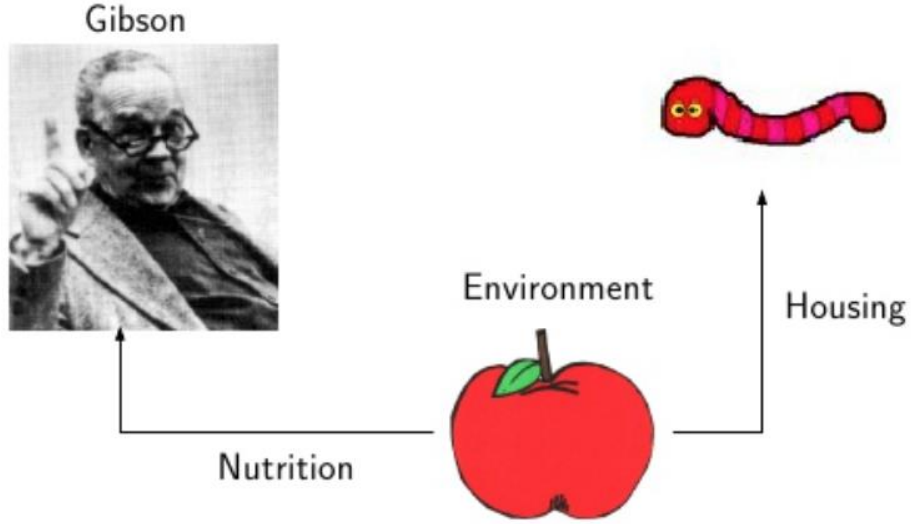

CAN YOU MAKE THAT LINK BUTTON BLUE INSTEAD OF BURNT ORANGE?
Dilbert.com
@ScottAdamsSays
YES, IF YOU WANT FEWER PEOPLE TO CLICK ON IT, AND YOU THRIVE ON BAD DESIGN.
4-12-16 © 2016 Scott Adams, Inc. /Dist. by Universal Uclick
I HAVE AN EYE FOR DESIGN.
AND I HAVE AN ELBOW FOR MUSIC.

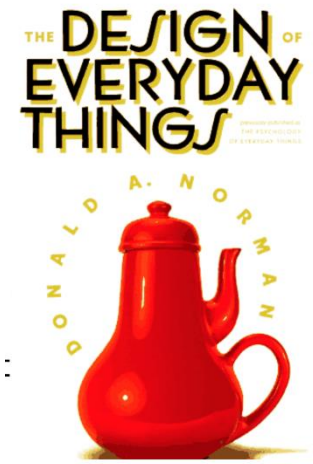
Importance of Affordances in UX Design

- The concept of affordances is fundamental to UX design
  - It underlies most UX design guidelines
  - It underlies most UX problems found in evaluation

What is an Affordance?

- Psychologist James Gibson, “Theory of Affordances”, 1977 article
  - “The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill.
- Cognitive scientist Don Norman, studied under Gibson.
  - “An affordance is a relationship between the properties of an object and the capabilities of the agent that determine just how the object could possibly be used. A chair affords (‘is for’) support and, therefore, affords sitting.”





http://www.kkstudio.gr/projects/the-uncomfortable

The Design of Everyday Things, Don Norman

Affordances in UX Design

- UX Design must consider affordance **signifier** roles
  - Appearance
  - Content and meaning
  - Manipulation characteristics
  - Functionality connection
  - Potential for emotional impact
- Affordances work together. Types of Affordances in Interaction Design:
  - Cognitive
  - Physical
  - Sensory
  - Functional
  - Emotional

In HCI/UX, an affordance is something that helps, aids, or makes it possible for a user to do something

Affordance signifiers are symbols of actions that can be performed and how to perform them. So we are really going to talk about affordance signifiers but we will still call them affordances

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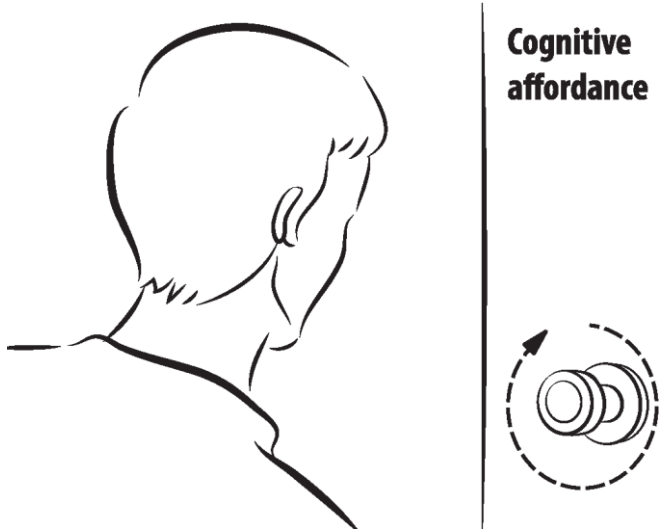

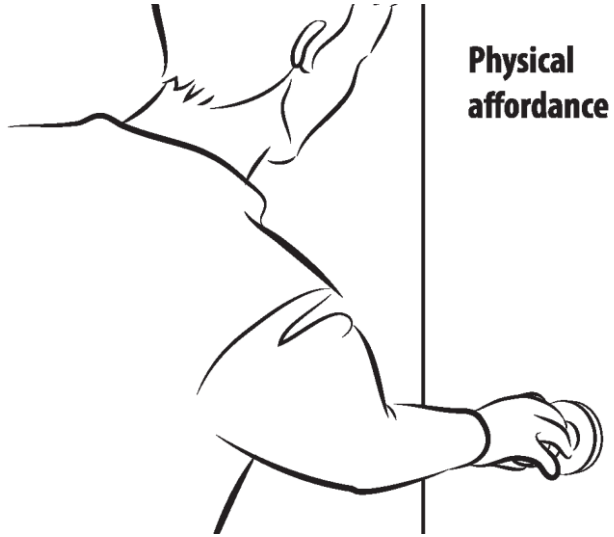

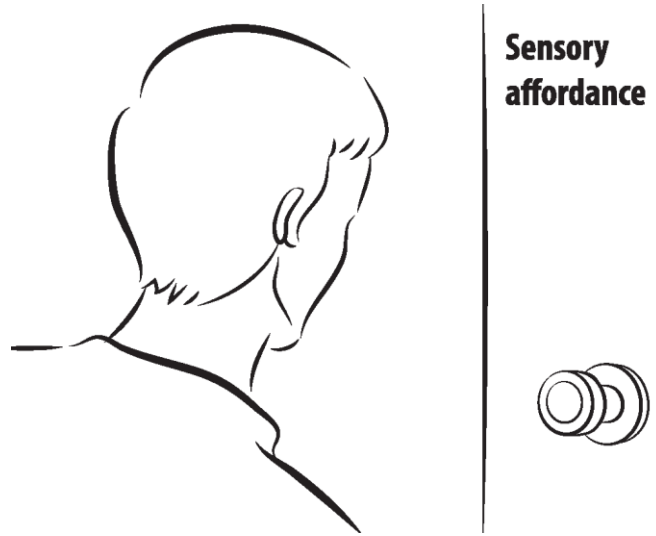

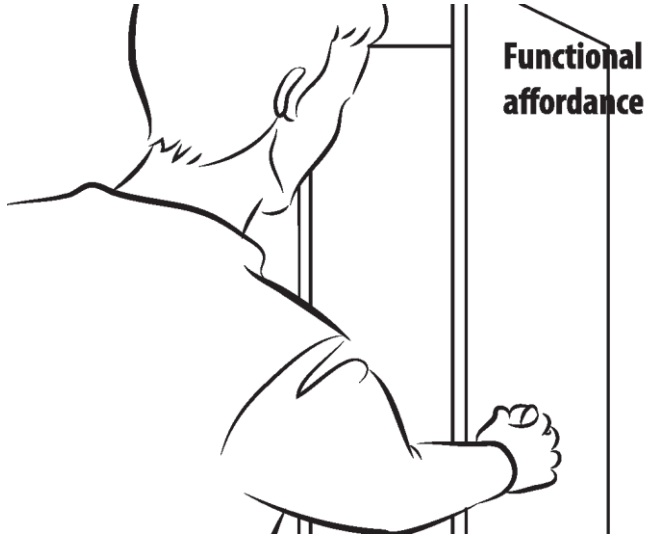

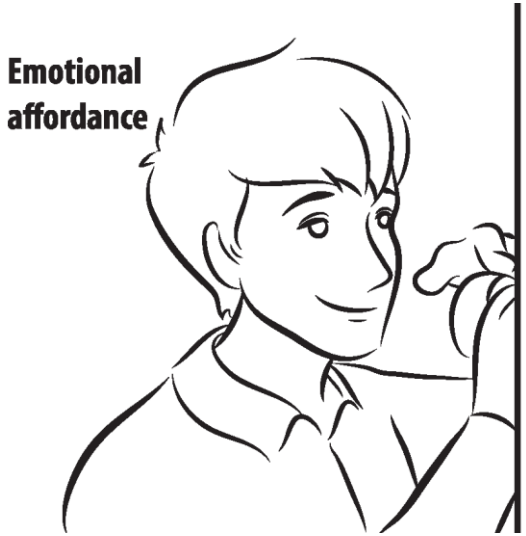

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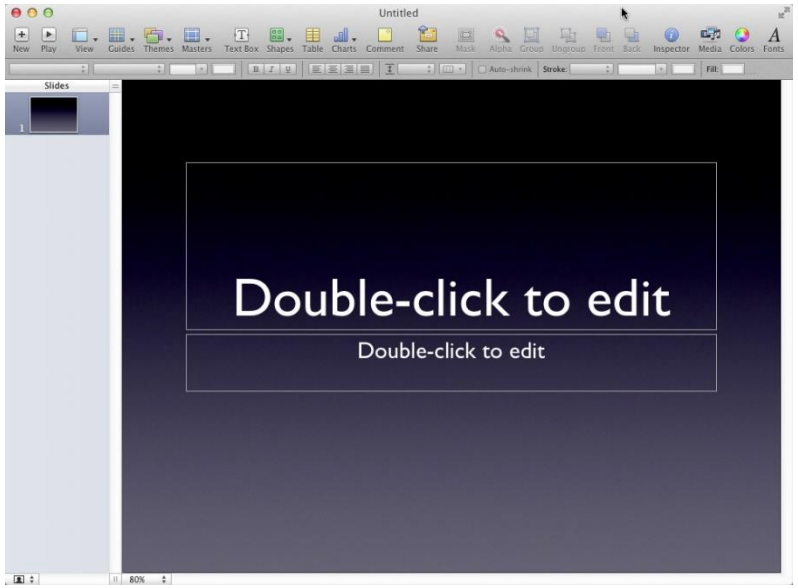
Cognitive Affordances

- A design feature that facilitates or enables users to do their **cognitive actions**
  - Thinking, deciding, learning, understanding, remembering, knowing about things
- Precise words and symbols for communicating
  - E.g. meaningful names and labels for buttons, menu items, hyperlinks
  - E.g., clear precise error messages
  - E.g., helpful instructions
  - E.g., Icon clearly conveys its meaning

Cognitive Affordances

Meaningful icons (conventions)



Help in getting started

Remember

Meaningful label (and icon)

False cognitive affordances

- Do not detach -

Simple Search	Advanced Search	Browse	Register	Help

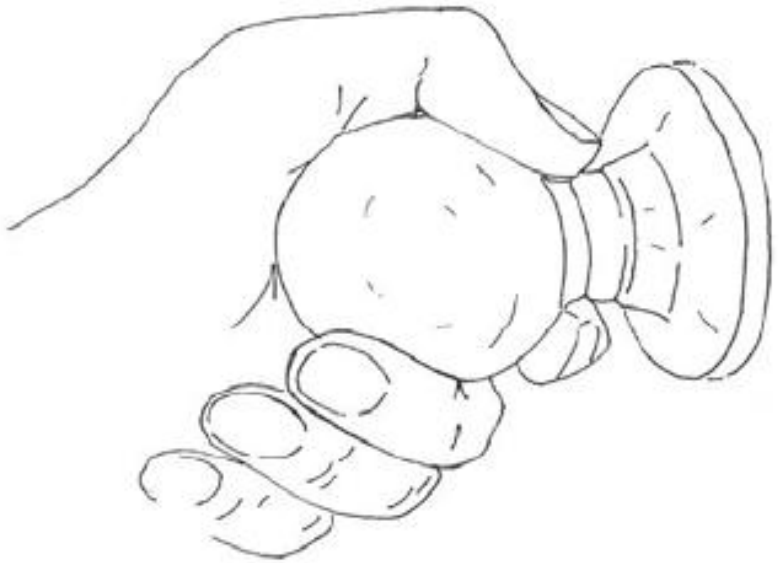
(Links in boxes look like buttons)

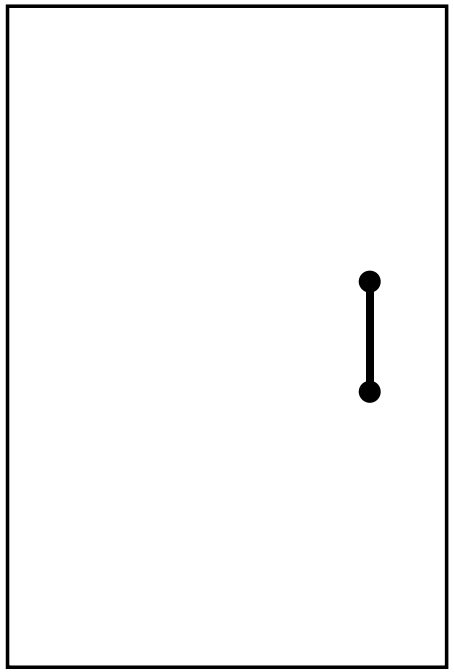
Physical Affordances

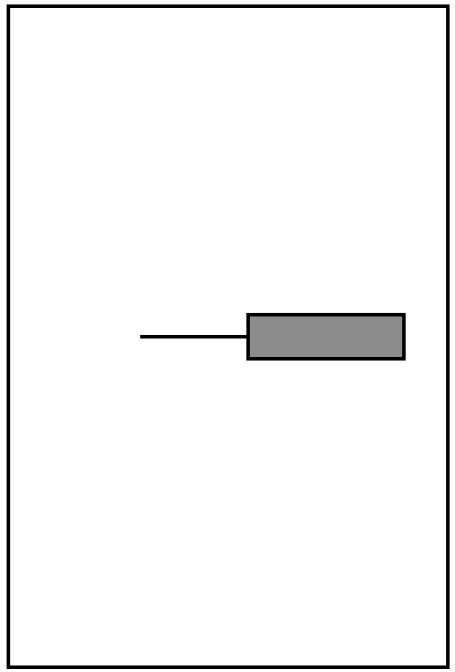
- A design feature that facilitates or enables users to do their **physical actions**
  - Clicking, touching, pointing, gesturing, and moving things
    - E.g., button size and location
  - In non-computer designs, it is about handles, levers, gripping, turning, moving things
- Design issues
  - Physical characteristics of interaction devices
  - Physical disabilities

Example - Physical Affordance

- Shape determines grasp strategy







Example - Physical Affordance

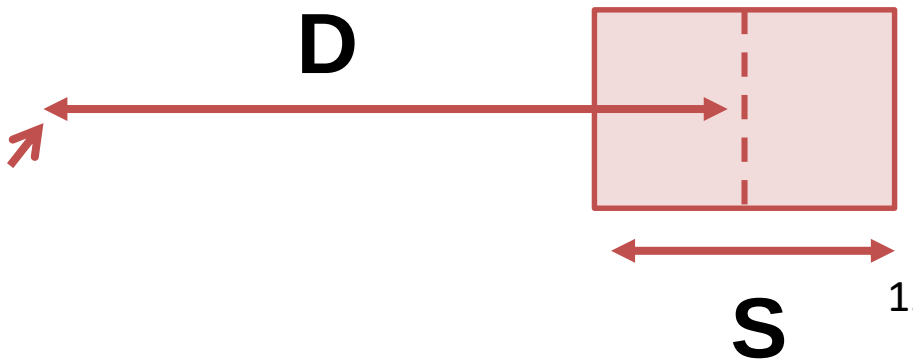
- Buttons afford pushing.
- Sliders and scroll bars afford dragging.

Skeuomorphic vs. Flat Design

- **Skeuomorphic design – metaphor based** design using graphical representation of real world objects
- **Flat design –** minimalist, emphasize simple usability
  - **More abstract** – object meaning and relationships expressed via color, shape, proximity

Fitts' Law

- An empirical model explaining **speed-accuracy** tradeoff characteristics of human **muscle movement** (1954).
- The **time** taken to **hit a target** (e.g. a button, menu or icon on screen) is a **function** of the **target size** of the target and the **distance** that has to be moved to the target
  - A larger target is easier to hit than a small one
  - A close target is easier to hit than a distant one
- Time T to move your hand to a target of size S at distance D
  - T= RT + MT
    - RT is **reaction time** (get hand moving), and
    - MT is **movement time**
      - MT = a + b log(D/S + 1)
      - Where log(D/S + 1) is the index of difficulty



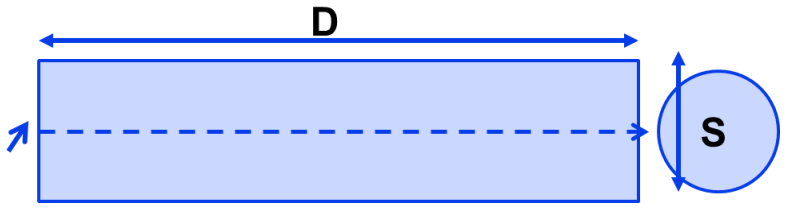
Fitts’ Law Demo

Fitts' Law Simulator

- Basis: physiological feedback loop
    1. Perceptual processor perceives hand location
    2. Cognitive processor compares to target location to determine remaining distance
    3. Motor system corrects to move remaining distance (may overshoot)

Implications of Fitts' Law

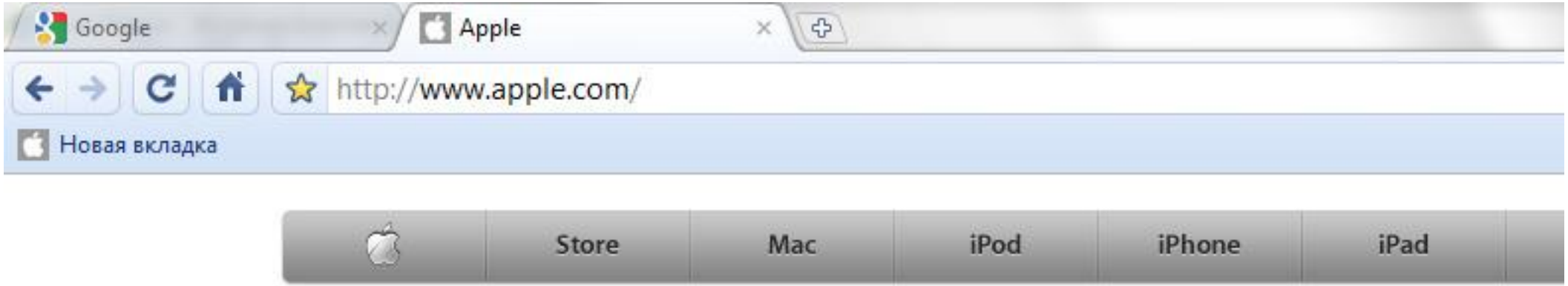
- **Large targets** and **small distances** between targets are advantageous
- Screen elements should **occupy** as much available **screen space** as possible
- The **largest** Fitts-based **pixel** is the one **under** the **cursor** (why?)
- Screen elements should take advantage of the **screen edge** whenever possible
  - The edges of the screen have infinite depth and no targeting required
- **Steering tasks** – moving linearly in a "tunnel" of length D and size S is **more difficult** than pointing



Limitations of Fitts' Law

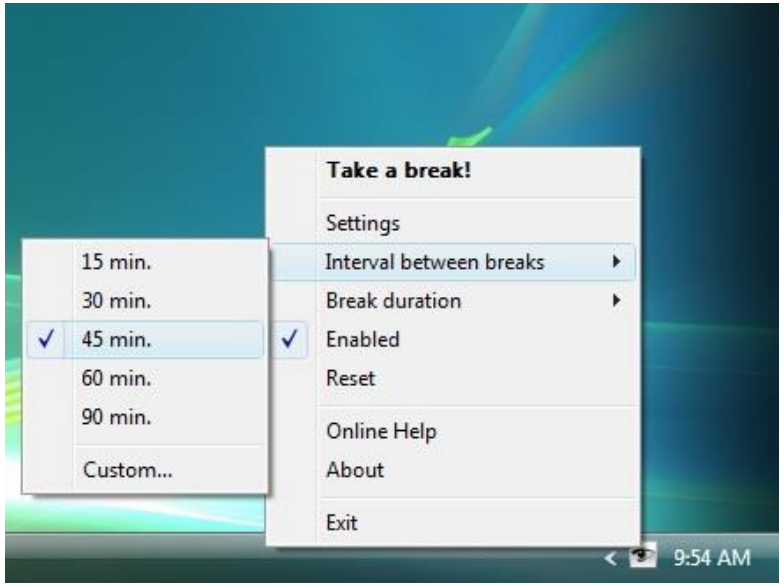
- Grouped **targets** that are **too close** lead to overshoot errors
- **Differing sizes** conflict with consistency
- **Frequency-based** widget **arrangements** may be **less efficient** to find things than l**ogic-based** arrangements
- **Pop-up** menus not visible until activated
- **Speed-accuracy tradeoff** - fast decision – more errors and vice versa

Google uses screen edge for tabs in Chrome



Apple doesn't

Small target



Pop-up menus

Large button target

Sensory Affordances

- A design feature that facilitates or enables users to **sense things**
  - Seeing, hearing, feeling (and tasting and smelling) something
- Used in **supporting role** to help user sense cognitive and physical affordances
  - Visibility and legibility of text
  - Audibility of sound
  - Devices associated with haptic/tactile sensations
- Example, legibility of button label text supported by
  - Adequate size font
  - Appropriate color contrast between text and background

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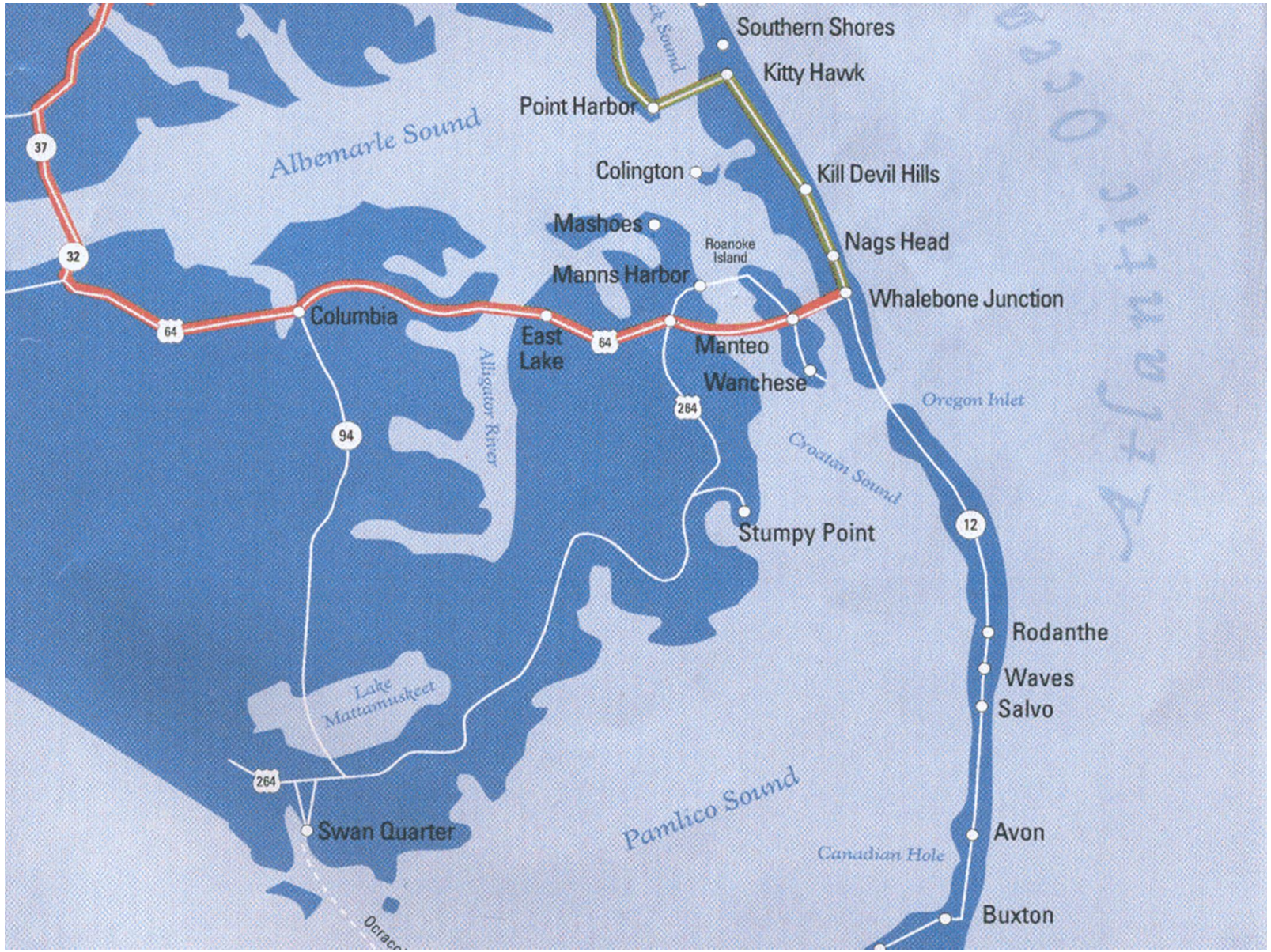


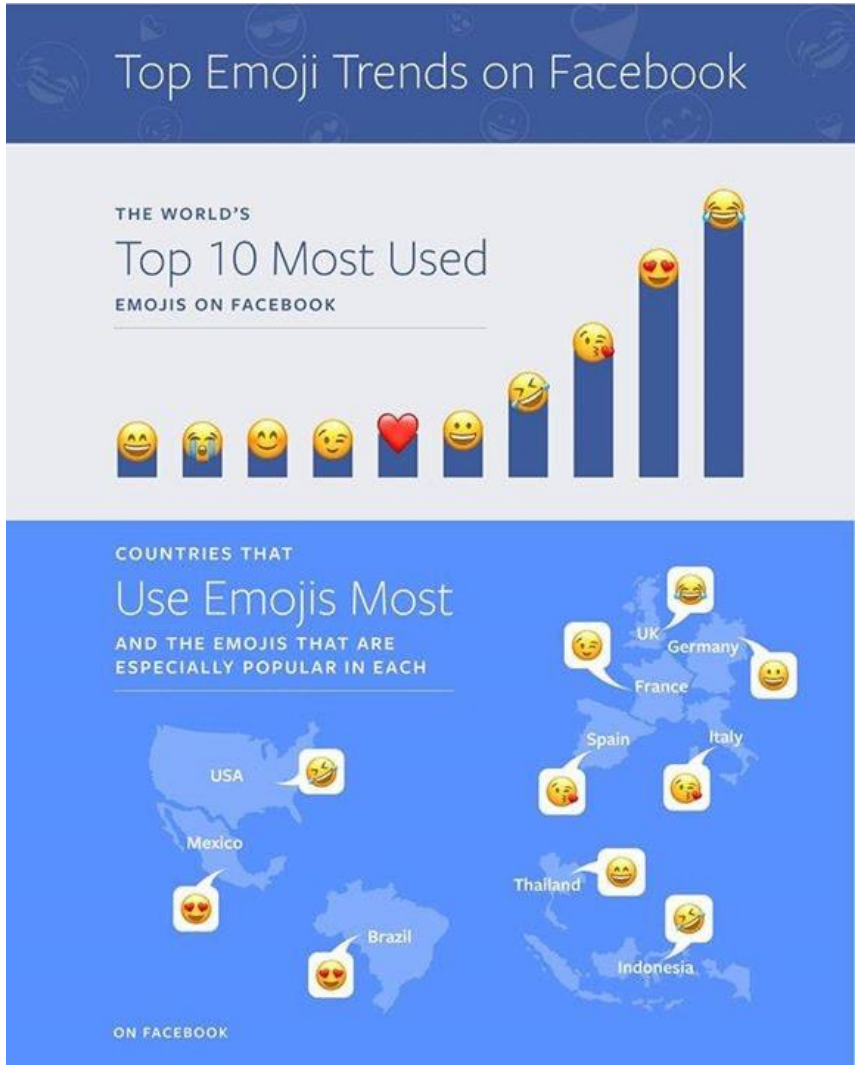
Usual colors switched, so you can't tell land from sea

Functional Affordances

- Links usability to **usefulness**
- Help users get things done
- Adds **purpose** to physical affordance
- The reason users make physical actions
- Example: “Add to cart” has functionality behind it to add item to your order

Emotional Affordances

- Features or design elements that make an **emotional connection** with users
- Derived from the cumulative impact of how well the other affordances succeed
- Example, the ambiance inside Ikea stores



Example

- Affordances in the design of a “sort” button
  - First question – is the functionality useful?
  - Cognitive affordance
    - Clear and unambiguous label
    - Context to let the user know when it is appropriate to use it
  - Physical affordance – button size and location relative to other objects
  - Sensory affordance – in support of cognitive and physical affordances – text size and font, color, background contrast
  - Emotional affordance – the user is satisfied with and trusts the result

User-created affordances as wake-up calls to designers

Project Activity

- Start working on the detailed design of your project
- Discuss its UI elements' affordances
  - What physical, cognitive, sensory, and emotional affordances do you recognize?
  - How can they be improved?

UI Id	UI Type	Functional affordance	Cognitive affordance	Physical affordance	Sensory affordance	Emotional affordance
B1	Button					

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