



Human Capability Part I

Generate an image: A cute, cartoon-style beaver wearing Oregon State University gear (orange hoodie with "OSU" on it), sitting on a log and thinking deeply. Above the beaver's head is a blown-out diagram of a brain, with colorful thought bubbles and arrows pointing to various icons representing human abilities: an eye (perception), a bell (attention), a filing cabinet (memory), a red/green color wheel (color perception), and a multitasking icon (divided attention). The style should be playful and slightly exaggerated for humor, like a smart animal having an "aha!" moment.

Announcements

- This & Next Week: Human capabilities
- Reflection Activity Due: Next Wed
- Midterm Key: Canvas (linked from schedule)

Five Human Abilities

1. Perception

- Gestalt principles
- Color

2. Attention

3. Memory



per·cep·tion

/pərˈsepSH(ə)n/

Perception and the Senses

Senses: smell, taste, sight, hearing, touch, proprioception (body position awareness), pain, temperature, balance, ...

Perception: how information is acquired from the world by senses

- they are the **input devices** to your brain's computation unit
- so, if doesn't make it thru senses => not delivered to brain.



Perception is...

- Driven by our experience
 - Perceptual priming
 - Familiar perceptual patterns/frames
 - Habituation
 - Attentional blink
- Driven by our goals

Perception is biased by experience -1

- You are meeting a building manager to discuss fire drill.



Perception is Expectation-driven -1

- You are meeting an advertisement firm

11111

Perception is Expectation-driven -1 [priming]

- **Priming** biases perception to see objects because of the context of the activity you are engaged in
 - Meeting with a real estate manager or advertisement firm



FIGURE 1.1

Building map or word? What you see depends on what you were told to see.

Perception is biased by experience – 2 [Frames]

- **Mental frames**/patterns bias perception to see objects/events **usually expected** in a situation...
 - ... incorrectly recall an item
 - ... users often click on buttons without really looking at them

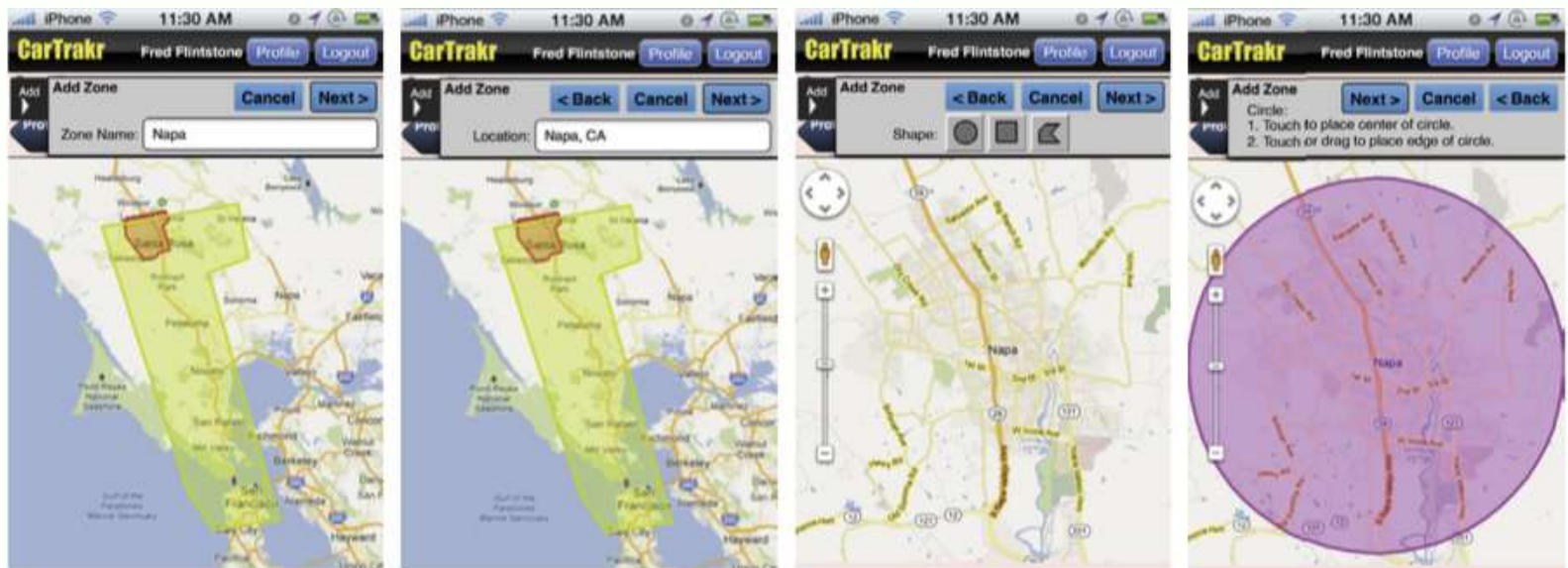


FIGURE 1.3

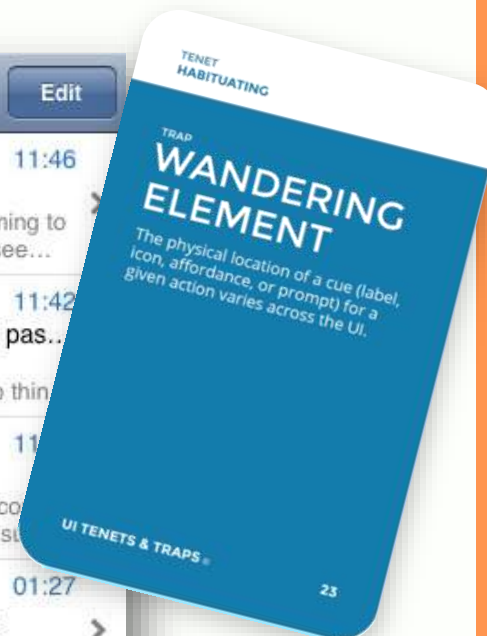
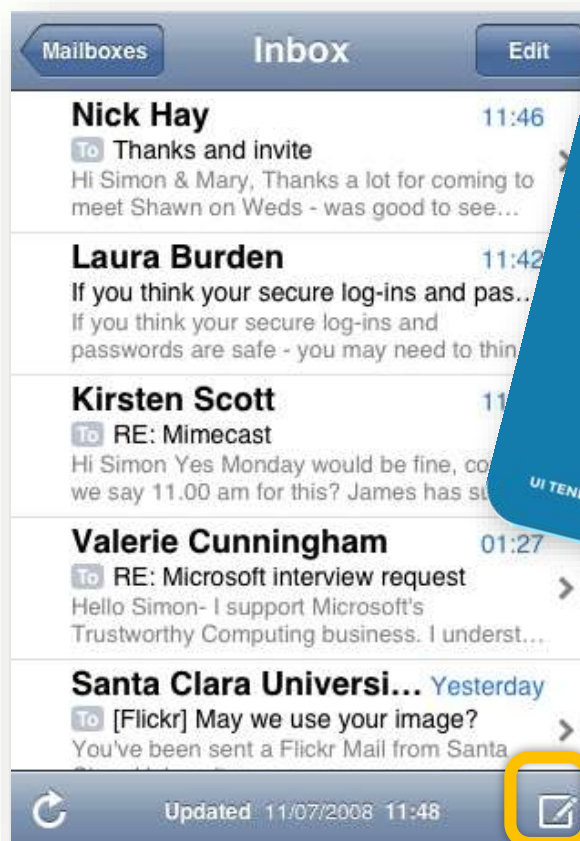
Users may always perceive the Next button on the right, even when it isn't.

Perception is biased by experience– 3 [Habituation]

- Repeated exposure dulls perception -> Habituation
 - Occurs at neuron level
 - Brain doesn't see the need to “read”/look for information
 - “muscle memory” (even amoeba)
- Habituation can be positive
 - Efficiency
 - Learnability/memorability

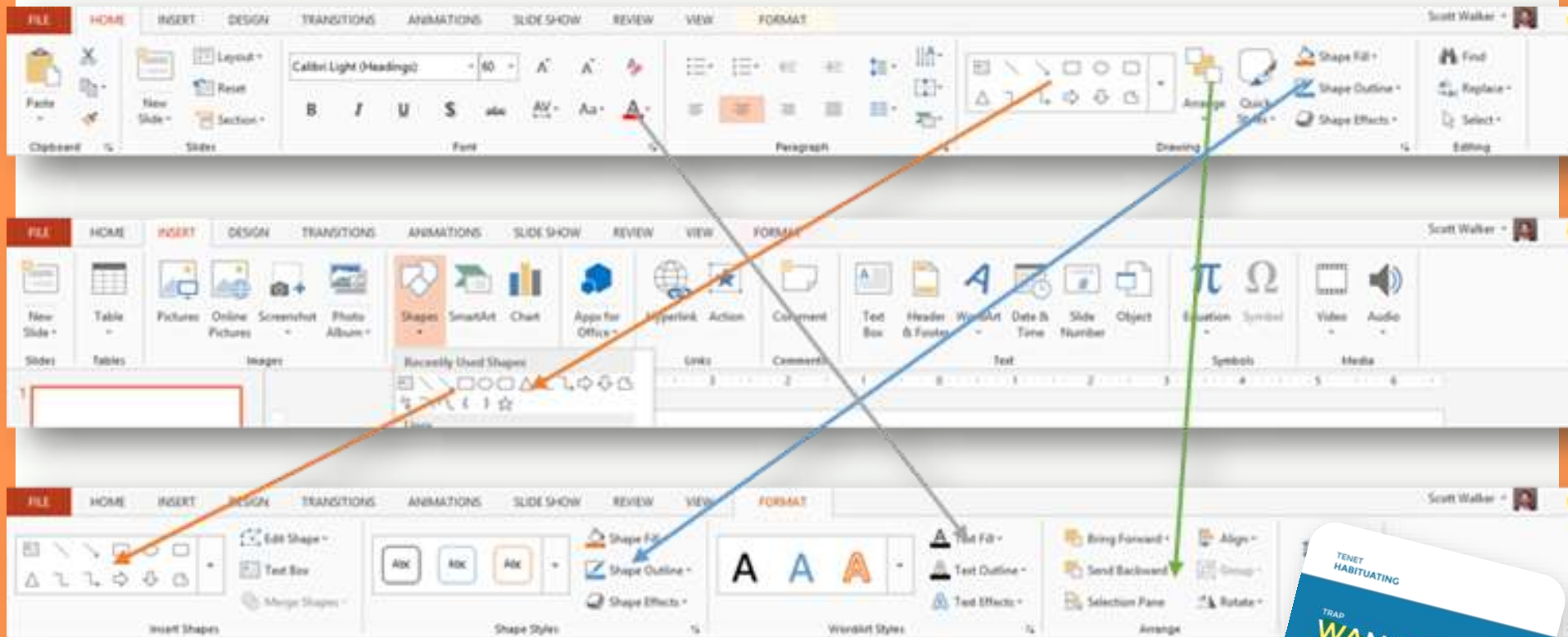
T&T #23 (Habituating): Wandering Element

Where's that control now?



T&T #23: Wandering Element

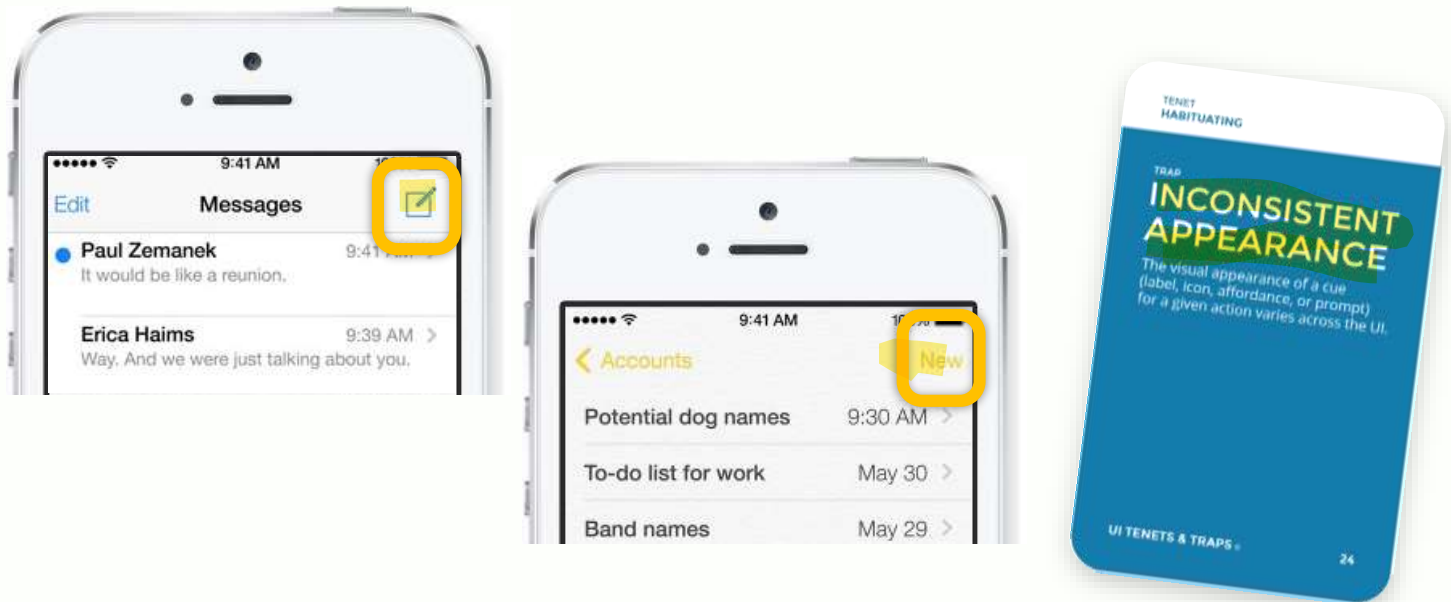
Where's that control now?



Same control, different location.

T&T #24 (Habituating): Inconsistent appearance

Are these the same thing?



Same control, different appearance.

Perception is biased by experience - 4 Attentional Blink

- Attentional blink:

- 0.15-0.45 after a recognition, we are blind/deaf to other stimuli
- Neurons busy processing the first stimuli
 - Especially if the first stimuli has meaning (and you need to process)
- Attention blink test:

<https://www.youtube.com/watch?v=MH6ZSfhdluM>

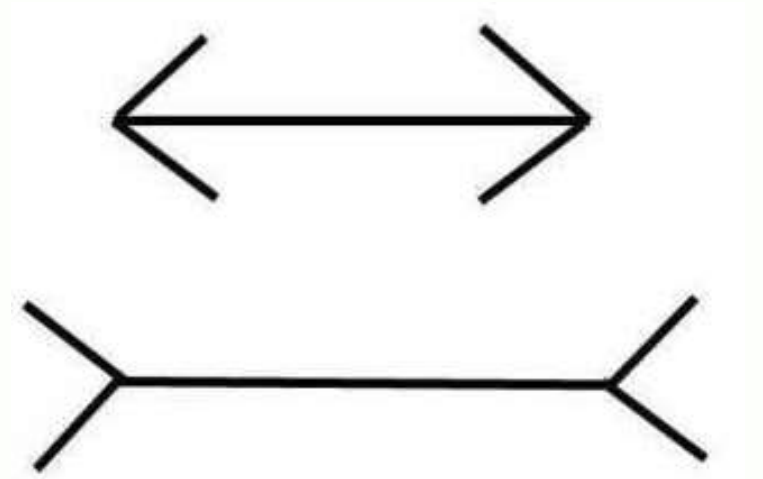
Perception is biased by experience – 5 [context]

- Perception is top down and biased by current (visual) context
 - Optical illusions

THE CHT

FIGURE 1.4

The same character is perceived as H or A depending on the surrounding letters.



Perception is...

- Driven by our experience
 - Perceptual priming
 - Familiar perceptual patterns/frames
 - Habituation
 - Attentional blink
- Driven by our goals
 - Guides our perception
 - Filters out other stimuli

Is there a tape (cello) in the toolbox?




Perception is Demand-driven

- Pulls in only what it needs (lazy, not eager).



Perception is Demand-driven

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Pay attention to the user goal/journey for UI

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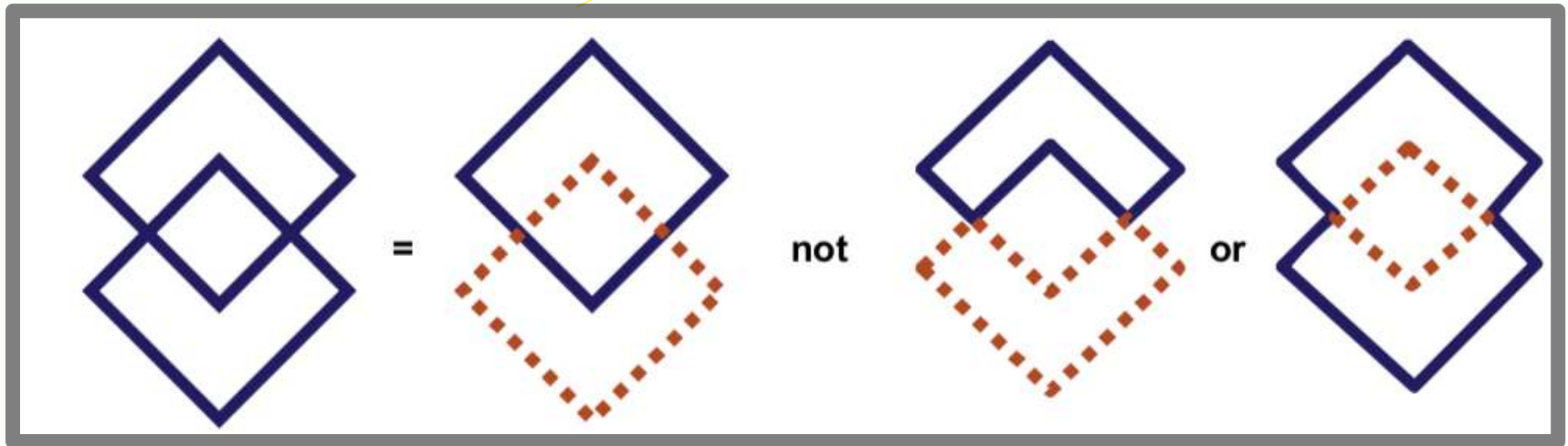
Gestalt Principles of perceptual organization

This is how our brain reduces complexity (to encode)

Our visual system reduces complexity

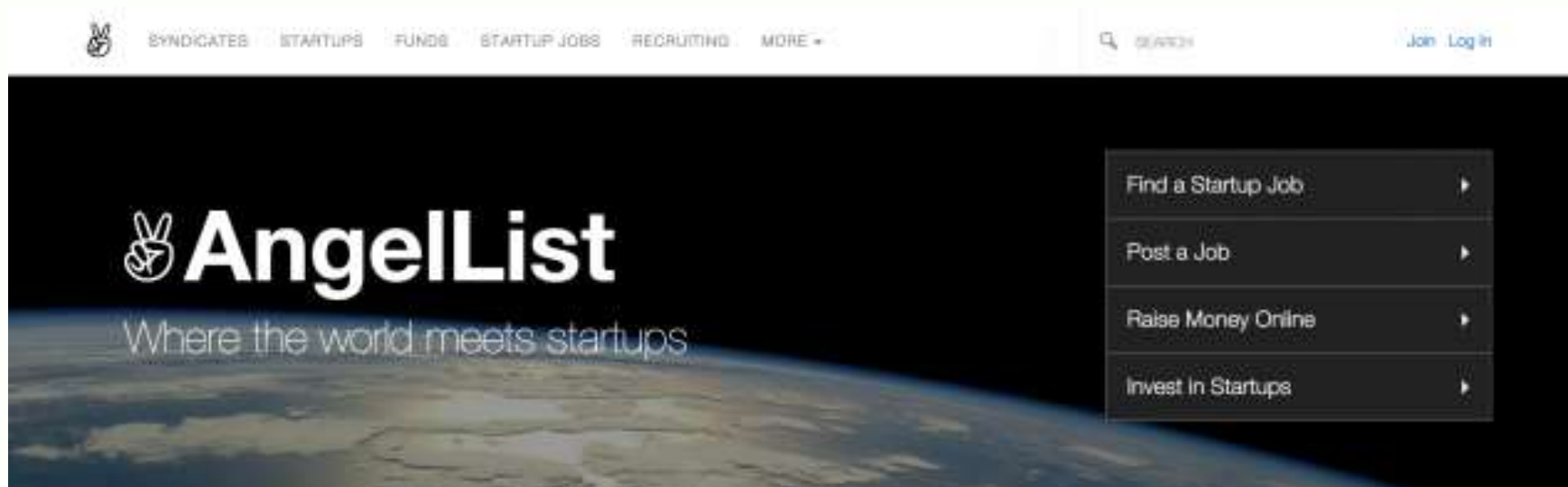
- We see structure

- Similarity, proximity, continuity, closure, symmetry
- Background/foreground
- Common fate.



Our visual system reduces complexity

- We see structure(s) (Gestalt principle).
 - Figure/ground.



Common fate (if they move together)

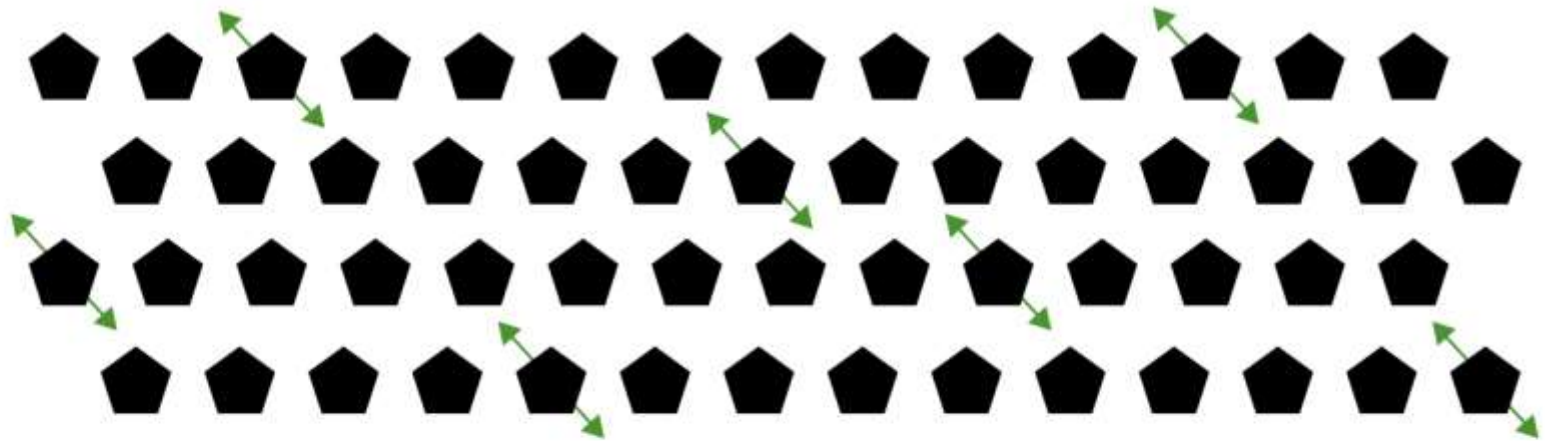
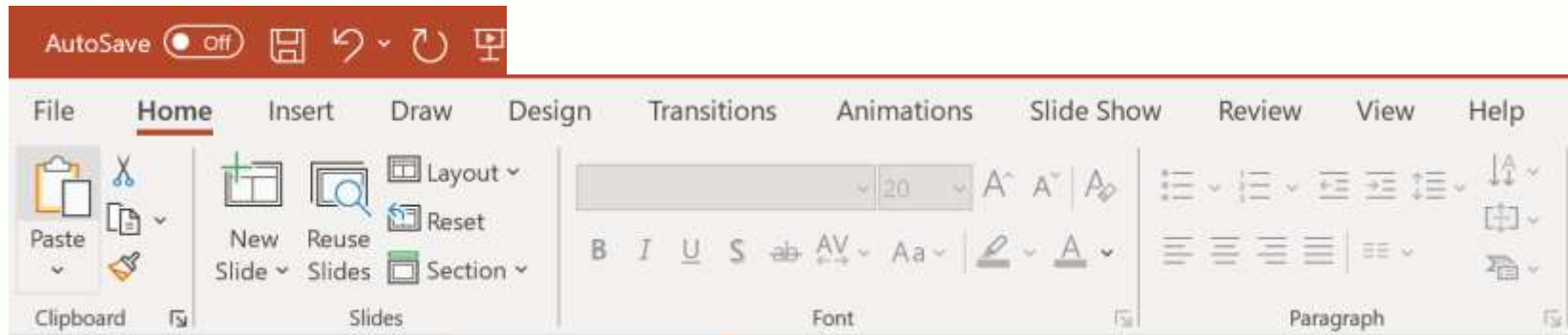


FIGURE 2.20

Common Fate: items appear grouped or related if they move together.

Exercise: Gestalt Principles: menu items that

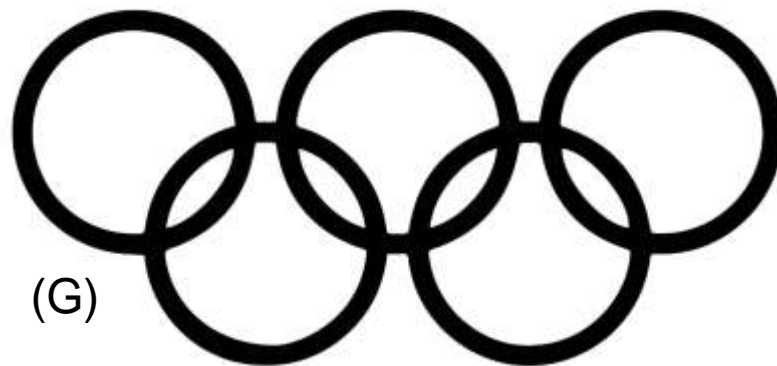
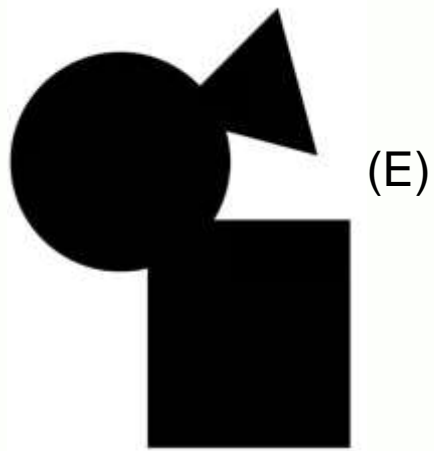
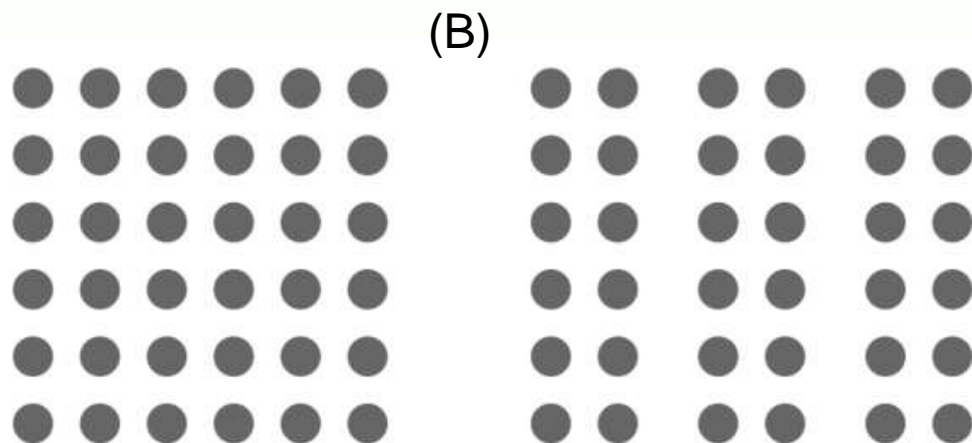


Which one(s) do you see in here?

For the figures you see next:

For each figure

1. List all the gestalt principles that apply
2. why the principle applies
3. How the principle can be used for UI design



When principles are violated

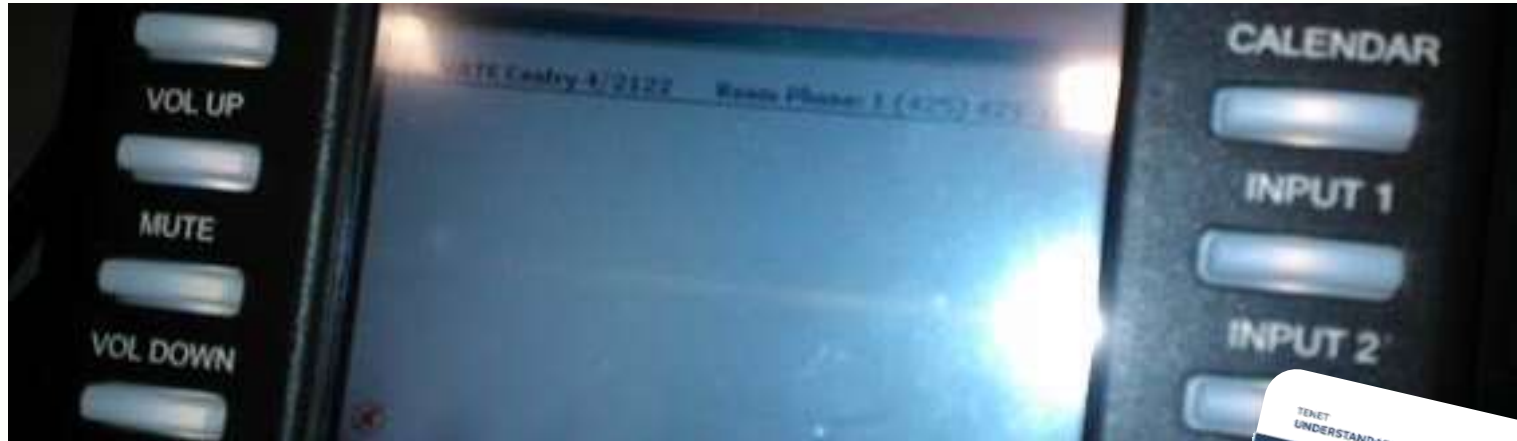
T&T #6: Poor Grouping

Going down?



T&T #6: Poor Grouping

Quick, mute the call!



T&T #6: Poor Grouping

Who did I vote for

1

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

A

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

ELECTORS FOR PRESIDENT AND VICE PRESIDENT	
(REPUBLICAN)	3 →
GEORGE W. BUSH - PRESIDENT DICK CHENEY - VICE PRESIDENT	
(DEMOCRATIC)	5 →
AL GORE - PRESIDENT JOE LIEBERMAN - VICE PRESIDENT	
(LIBERTARIAN)	7 →
HARRY BROWNE - PRESIDENT ART OLIVIER - VICE PRESIDENT	
(GREEN)	9 →
RALPH NADER - PRESIDENT WINONA LaDUKE - VICE PRESIDENT	
(SOCIALIST WORKERS)	11 →
JAMES HARRIS - PRESIDENT MARGARET TROWE - VICE PRESIDENT	
(NATURAL LAW)	13 →
JOHN HAGELIN - PRESIDENT NAT GOLDHABER - VICE PRESIDENT	

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

(REFORM)

← 4

PAT BUCHANAN - PRESIDENT
EZOLA FOSTER - VICE PRESIDENT

(SOCIALIST)

← 6

DAVID McREYNOLDS - PRESIDENT
MARY CAL HOLLIS - VICE PRESIDENT

(CONSTITUTION)

← 8

HOWARD PHILLIPS - PRESIDENT
J. CURTIS FRAZIER - VICE PRESIDENT

(WORKERS WORLD)

← 10

MONICA MOOREHEAD - PRESIDENT
GLORIA La RIVA - VICE PRESIDENT

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

TRAP
UNDERSTANDABLE

TRAP
**POOR
GROUPING**

A critical relationship between two
or more otherwise noticeable cues
(labels, icons, affordances, or
prompts) is not obvious.

UI TENETS & TRAPS

Perception recap

- Perception is what we interpret what comes through the senses
- Perception is driven by our experiences
- Perception is driven by our goals
- Our visual system reduces complexity (gestalt principles)

Other senses

- **Sound (hearing):**
 - **Pitch – frequency, loudness – amplitude**, location
 - We are good at sound! We have a lot of bandwidth, in part because of language facilities.
 - UIs can use when appropriate
 - but can hog our attention.
- **Touch:**
 - **Pressure**, pain, temperature (hot/cold).
 - Potential for use in advanced UIs.
- **Motor system (input & output system):** Often causes errors: wrong button, double-click vs. single-click, ...

Next Class: Human abilities

- Visual perception: color
- Attention
- Memory

/

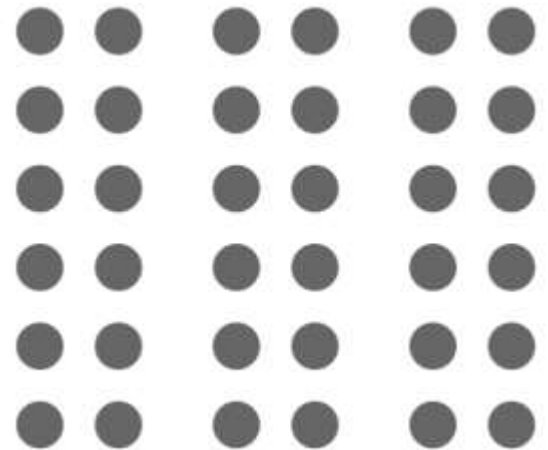
Quiz

Activity

Perception is Expectation-driven – 3 [Habituation]

- No change dulls perception -> Habituation
 - Brain doesn't see the need to “read”/look for information
 - “muscle memory”
- Habituation can be positive
 - Efficiency
 - Learnability/memorability





Habituation

- What do you think about this UI:

