



# 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





# 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

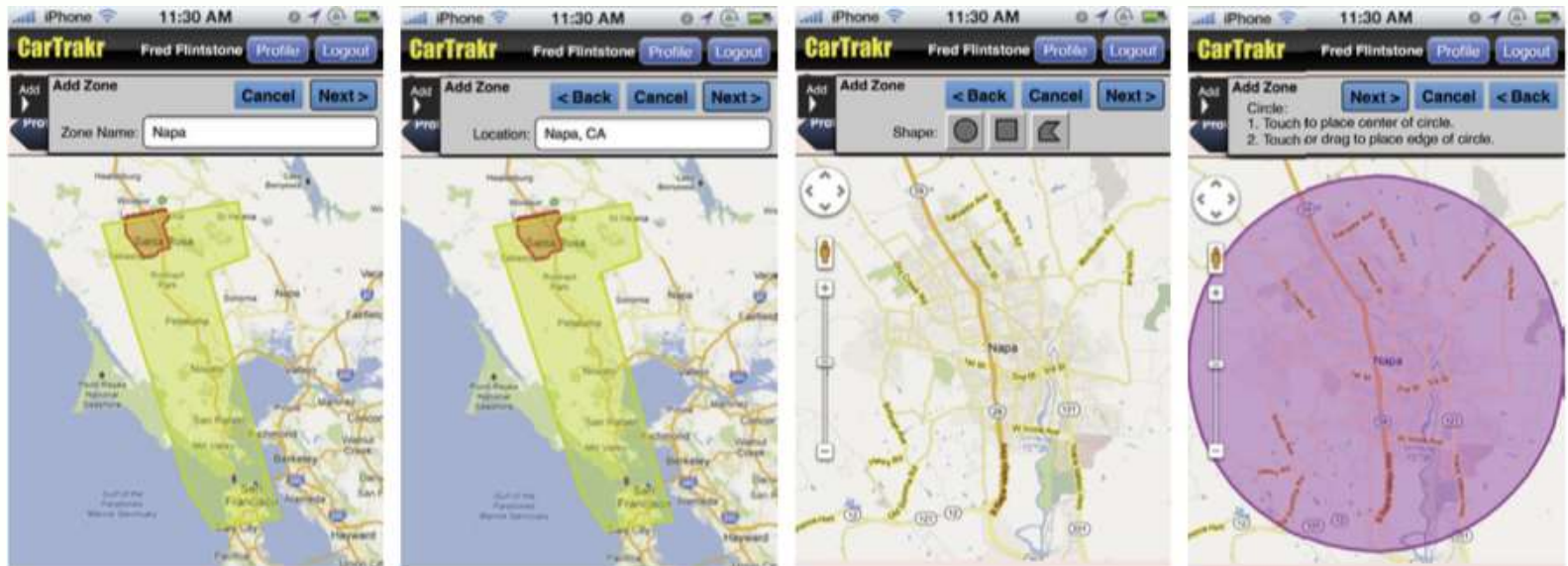


FIGURE 1.3

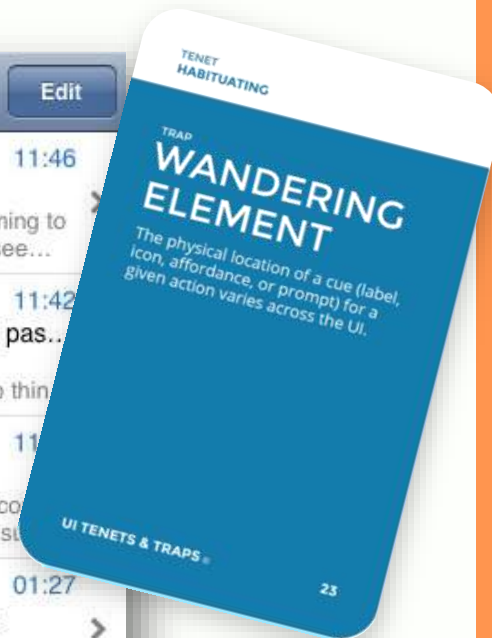
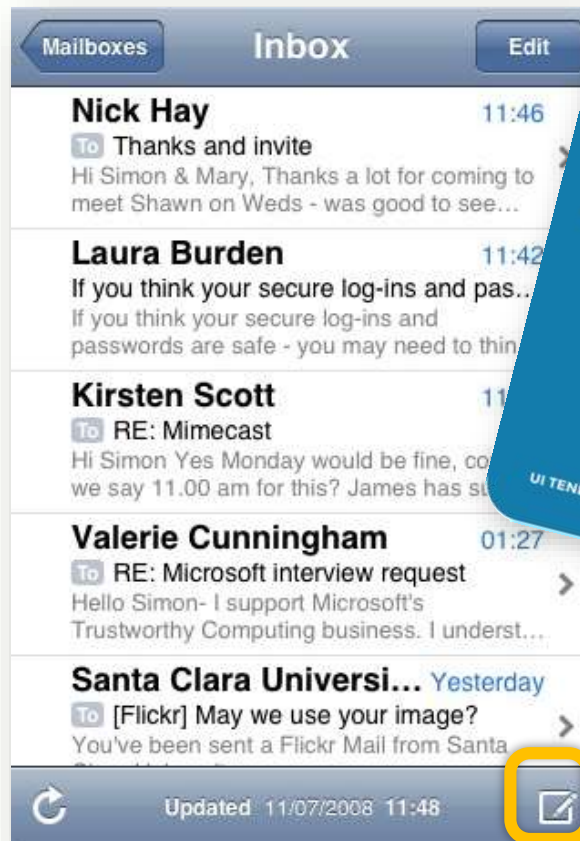
Users may always perceive the Next button on the right, even when it isn't.

## 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

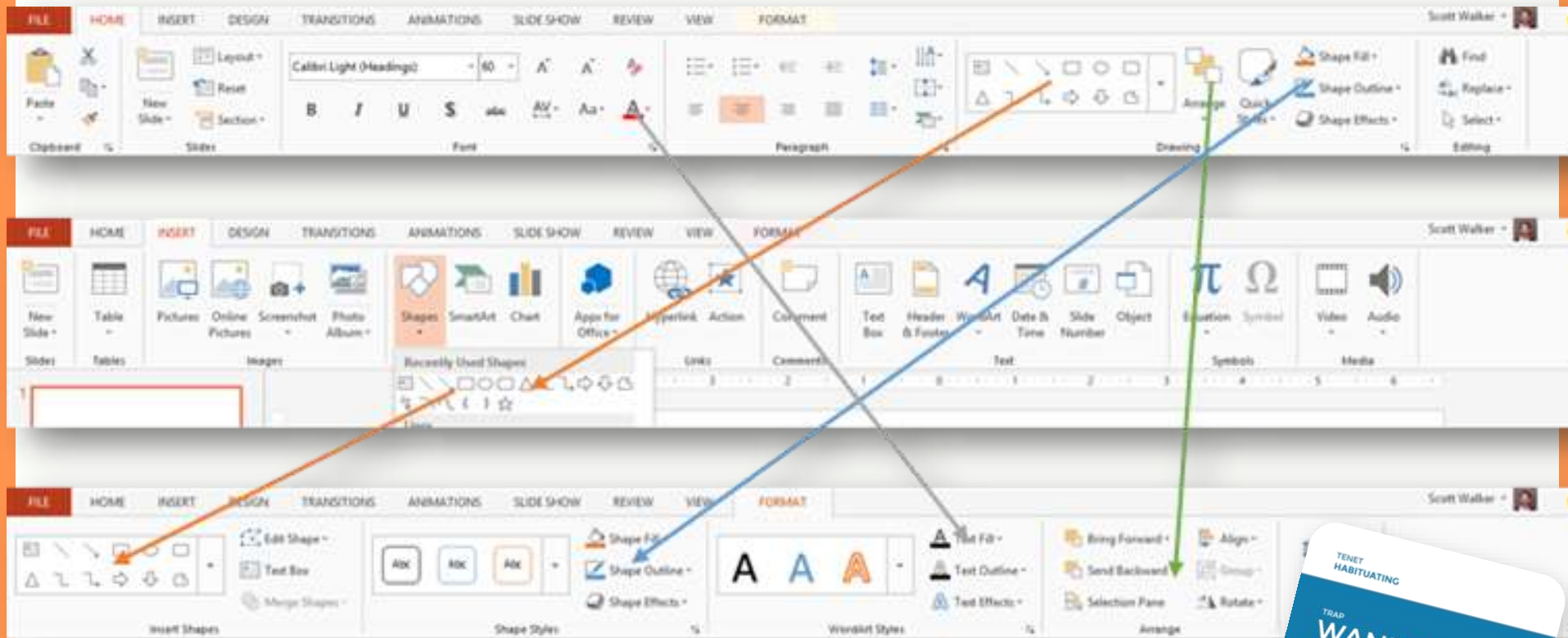
# T&T #23 (Habituating): Wandering Element

## Where's that control now?



# T&T #23: Wandering Element

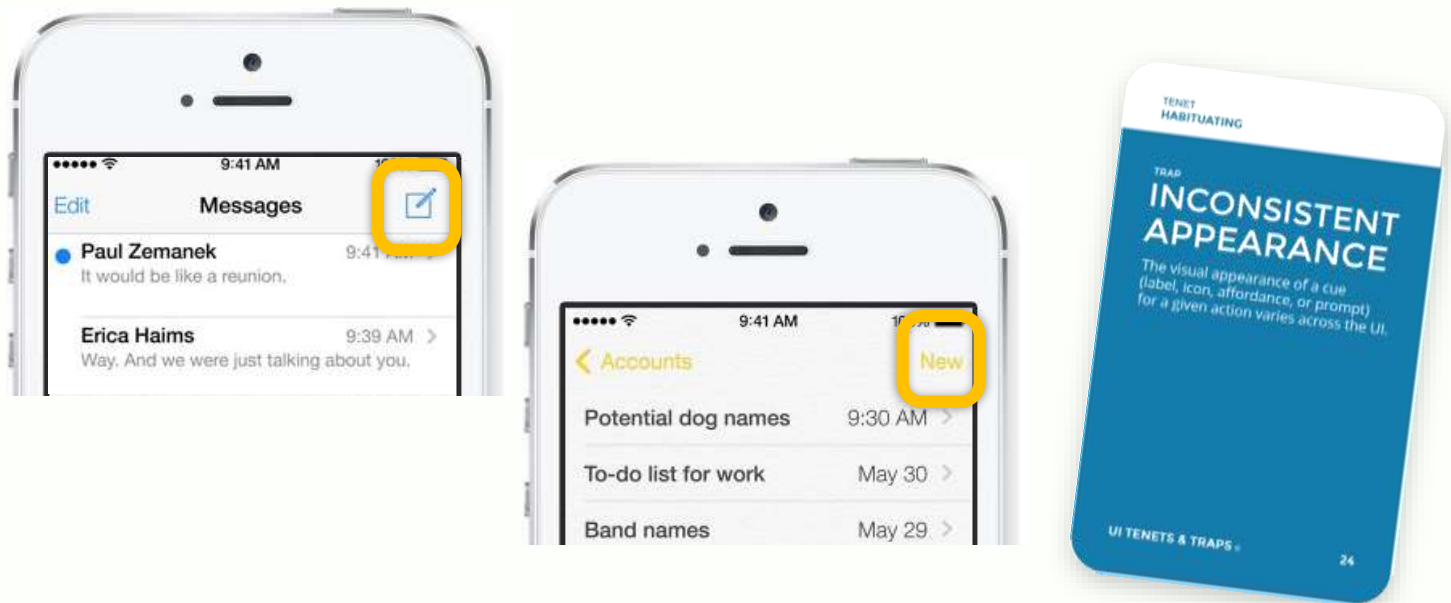
Where's that control now?



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:
  - 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>



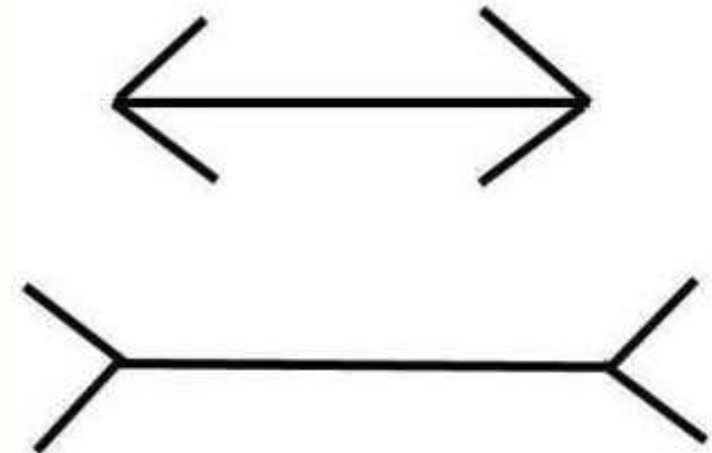
# Perception is biased by experience – 5 [context]

- 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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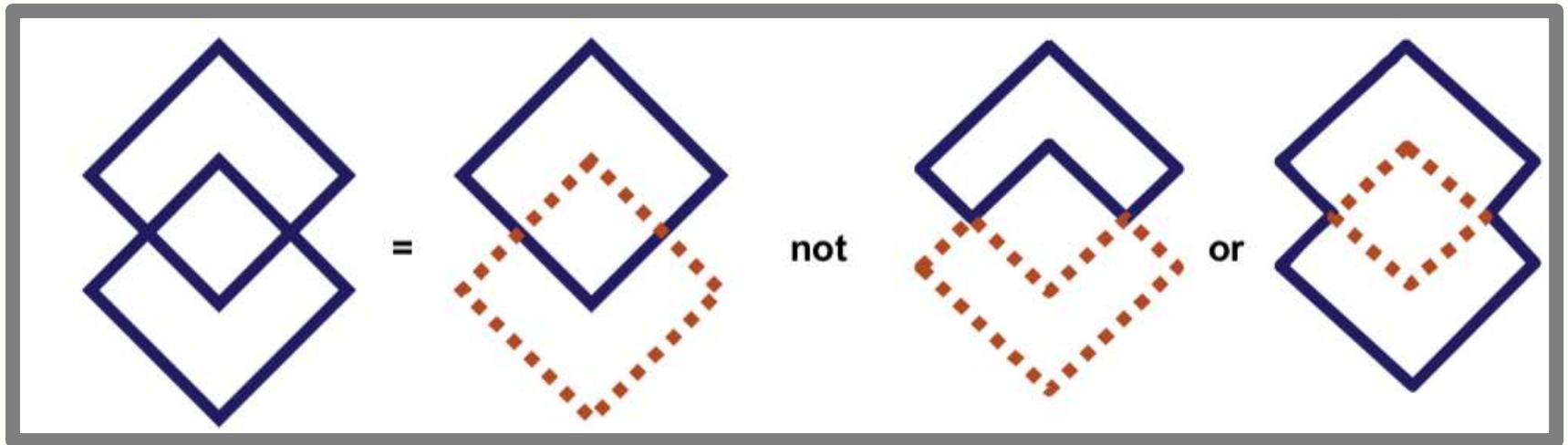
Sign In Using login.gov Credentials

# **Gestalt Principles of perceptual organization**

This is how our brain reduces complexity (to encode)

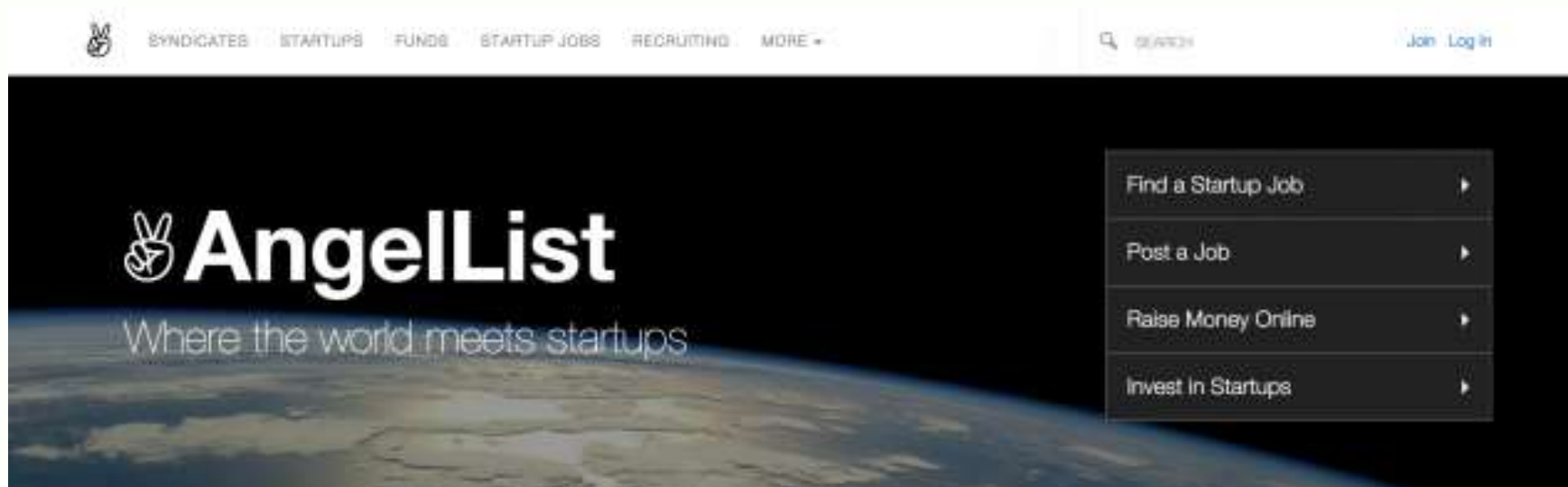
# Our visual system reduces complexity

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



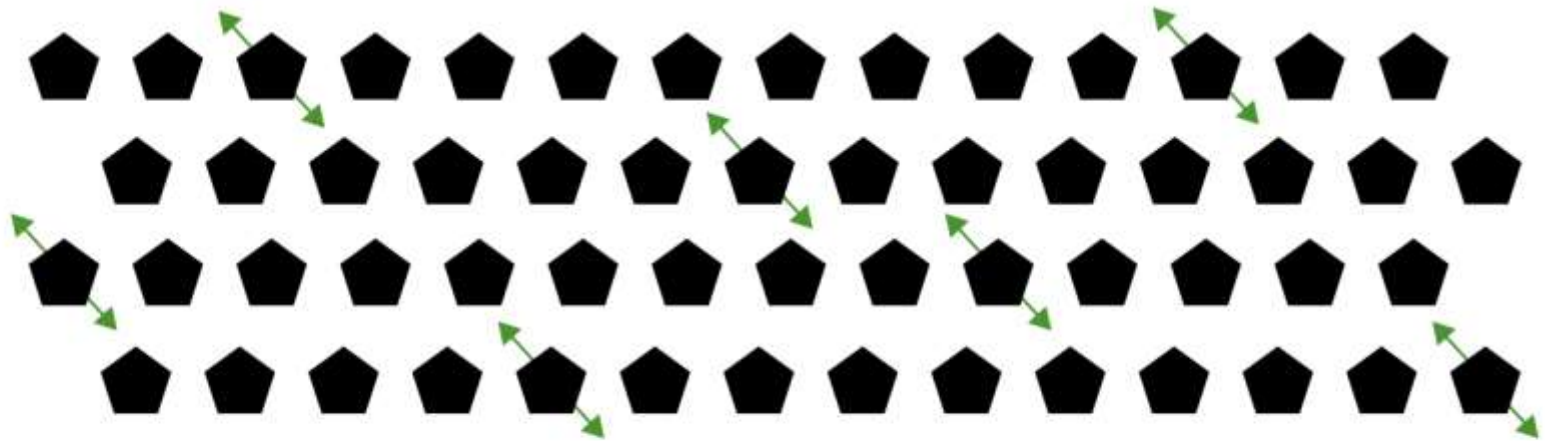
# Our visual system reduces complexity

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





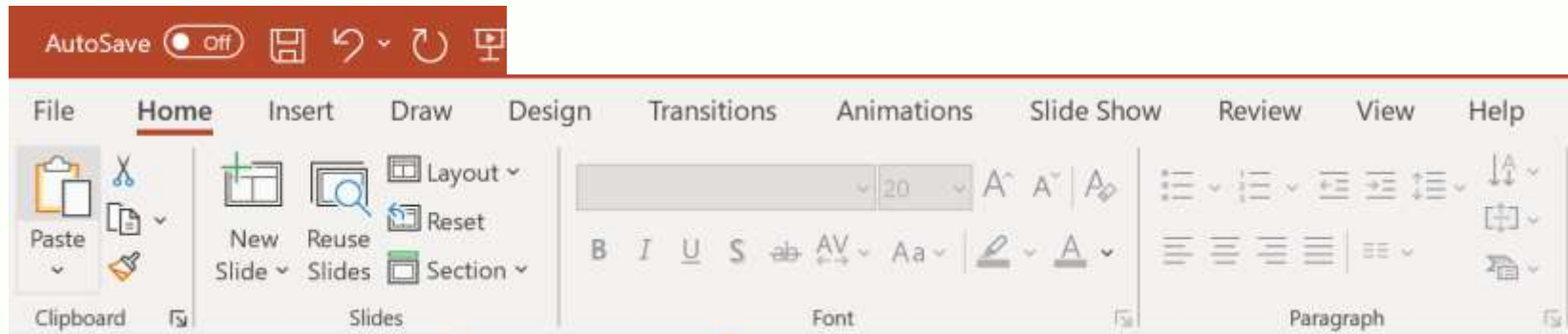
## Common fate (if they move together)



**FIGURE 2.20**

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

# Exercise: Gestalt Principles: menu items that

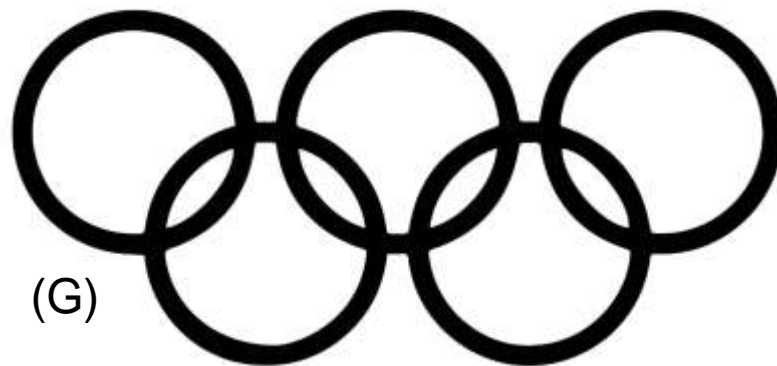
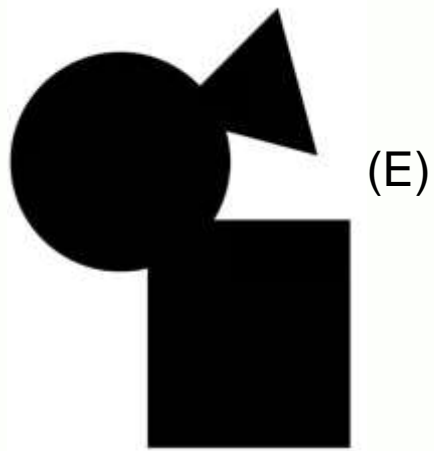
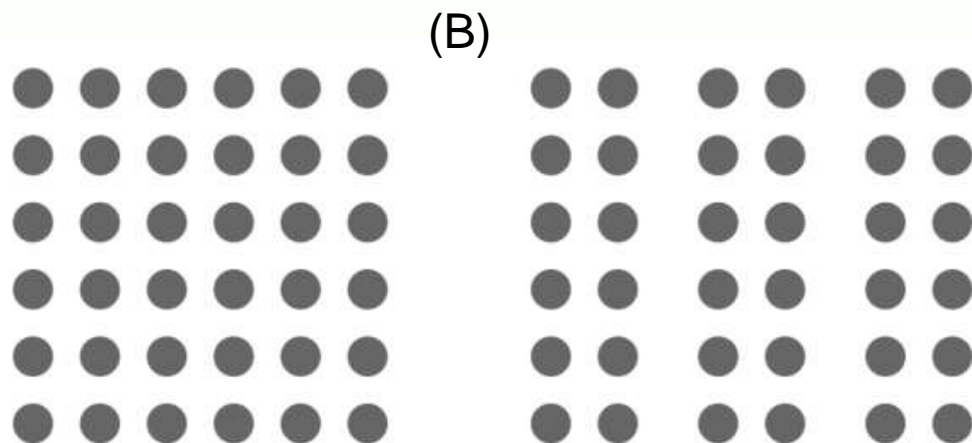


Which one(s) do you see in here?

## **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

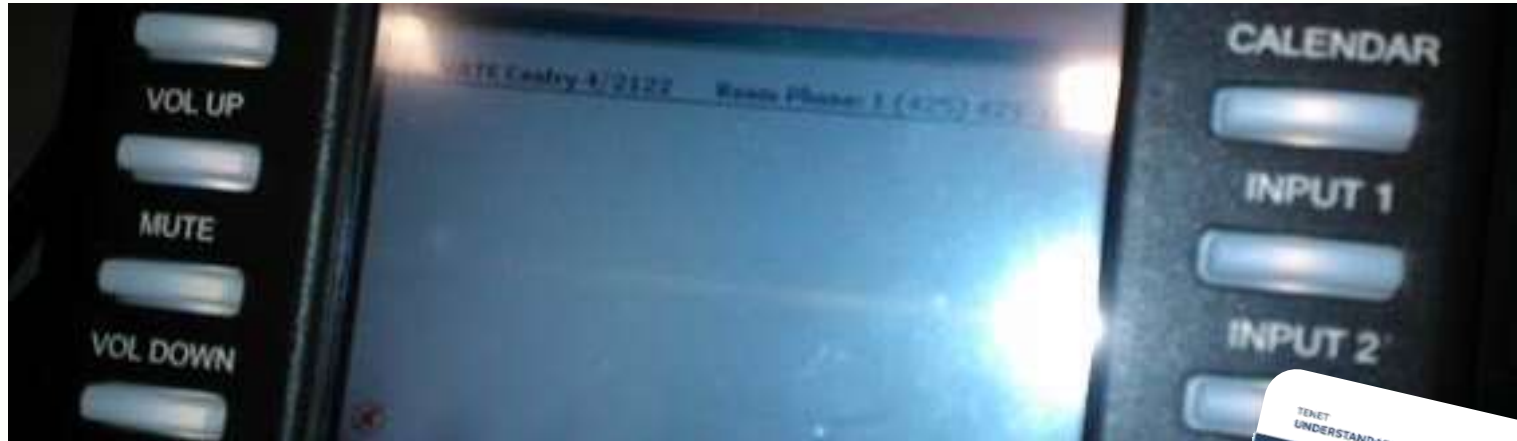
# T&T #6: Poor Grouping

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

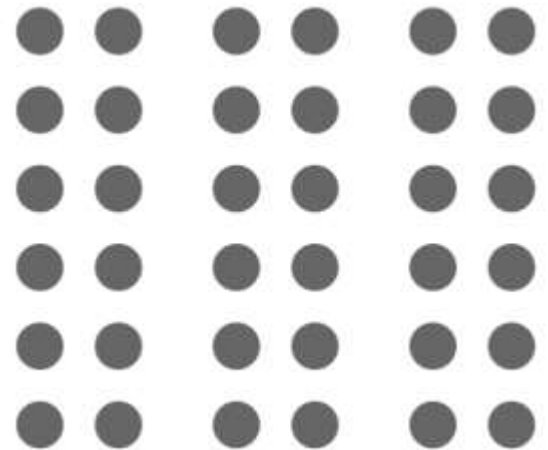
# Quiz

# 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:

