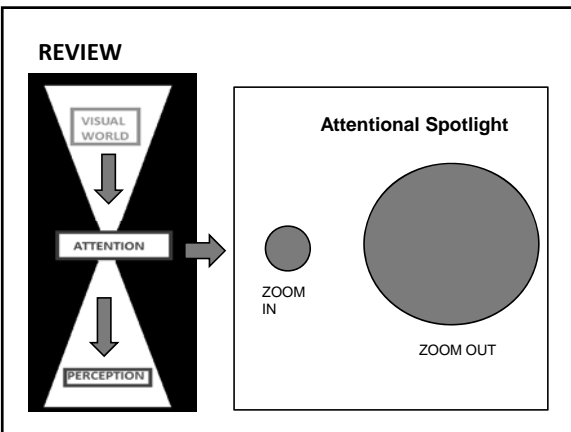


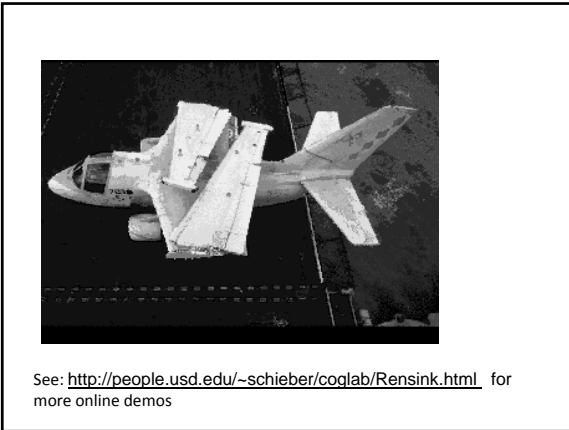
PSYC 368 – ATTENTION TO SCENES
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GRADUATE PROGRAM IN
NEUROSCIENCE

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Instructional Objectives

1. Discuss the role of attention in change blindness, based on the scene perception videos shown in class.
2. Explain the two processes of how we recognize a scene
3. Examine the link between attention and awareness
4. Learn about multiple-object tracking and implications regarding attentional capacity
5. Determine if we can split attention to two separate locations at once

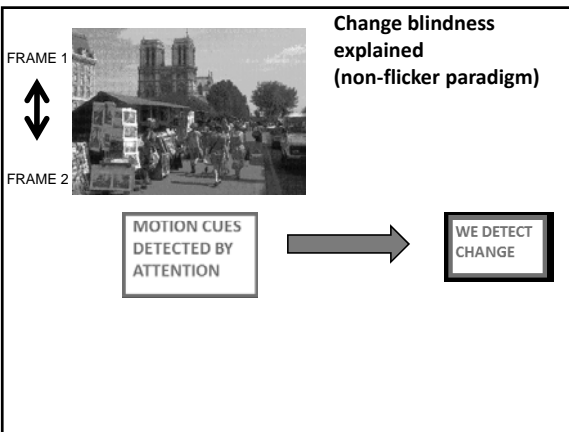




What happened?

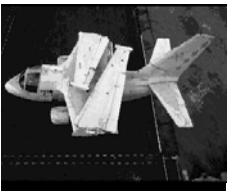
Flicker paradigm vs Non-flicker paradigm

- harder to detect scene changes in flicker paradigm
- flicker paradigm displays phenomenon of **CHANGE BLINDNESS** (inability to detect obvious change)
- **BLANK SCREEN is the difference between two paradigms**




Change blindness explained (flicker paradigm)

FRAME 1



blank screen

FRAME 2




- blank screen wipes out motion cues
- Attention has to be directed right over area where change is happening
- "change blindness" occurs until attention is at the right spot

What change blindness teaches us about attention

Attention is required to detect scene changes

With motion cues = easy (non-flicker paradigm)

Without motion cues = change blindness can occur (flicker paradigm)



2. How do we recognize scenes?

A) Cues from the scene itself
B) Cues from our own internal processing

Q: HOW DID WE RECOGNIZE THIS SCENE DESPITE IT BARELY BEING ON THE SCREEN?

A: the "gist" or basic spatial frequency of the scene allows us to construct an image even when it is only presented at brief durations

A. Cues from the scene



•Scenes with horizon have strong horizontal components

(horizontal bars)



Scenes with horizons have strong vertical components

(vertical bars)

B. Cues from our own processing



Global -- Global process analyzes the spatial frequency components of the "gist"

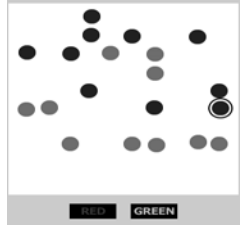


Local -- Local attention-dependent processes kick in and identify details

Source: Oliva and Torralba (2001)

Attention and Awareness

Count the Passes



Activity 8.5 – The Attentional Bottleneck

Points on attention and awareness

Inattention blindness-
phenomenon of not being able
to see things that are actually
there

WHY?

Our attention is divided elsewhere
(divided attention)
- Suggests we have an attentional
limit (to be discussed later)



Attention and Awareness: The Big Picture

•Lab studies can exploit the difference
between what we can see and what we
can actually perceive
- ex. inattention blindness and
change blindness

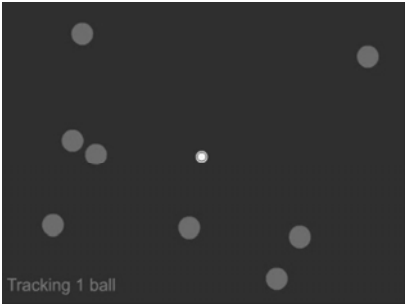
*Changes in the real world are more
predictable than they are in any
experimental setting; the physical
world acts as a backup to the
perception of events in your mind.

BREAK

MULTIPLE-OBJECT TRACKING

Criss Angel MindFreak Demo

Multiple Object Tracking – In the lab



Tracking 1 ball

Full Report vs Partial Report

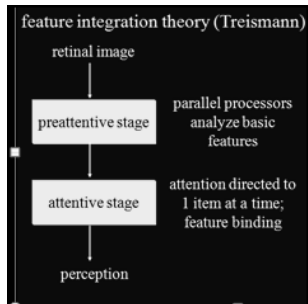
Real World Multiple Object Tracking

EXAMPLES?



understanding attentional mechanisms of multiple object tracking important in the real world and for artificial intelligence

REVIEW (368, Lecture 12)



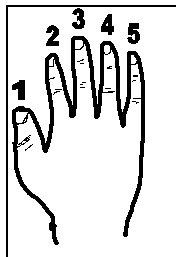
Pylyshyn (1988)

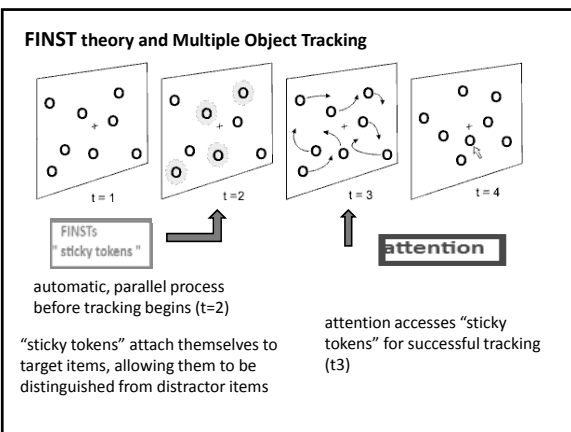
FINSTs are the preattentive process

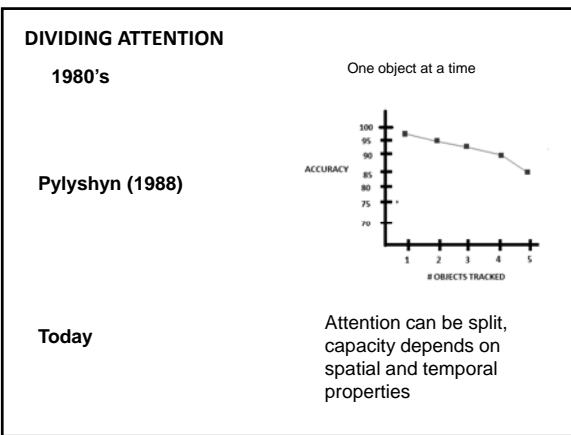
What are FINSTs?

- Sticky tokens that attach to the features before attention is deployed

- Provide no information about the feature, but maintain spatial relationships between features







- ### How many items can we track at once?
- Alvarez (2007) – Speed/Capacity Trade-off**
 - at slow speeds, can track up to 8 objects at once
 - at fast speeds, can track 1-2 objects at most
 - Target-Target Distance/Accuracy Trade-off**
 - Easier to track multiple items when target-target distance decreases
 - Size of objects may play factor as well

Can attention be split into several places at once?

Cavanagh and Alvarez (2005) – Hemifield effect

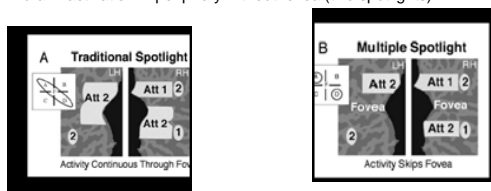
- Easier to track multiple objects when they are split into opposite hemifields as opposed to the same hemifield



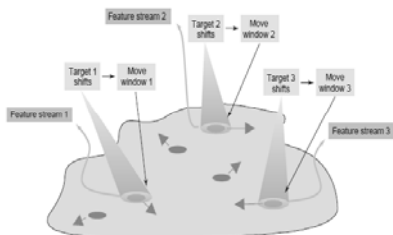
Does one attentional spotlight cover both hemifields, or is the spotlight split at two different locations at once?

Split Spotlight Neuroimaging Evidence – McMains and Somers (2005)

- 2 attentional blink tasks in the periphery,
- requires attention at both locations to do good
- brain activation in visual areas corresponding to periphery including fovea (one spotlight)
- brain activation in periphery without fovea (two spotlights)



A POSSIBLE EXPLANATION? THE MULTI-FOCAL HYPOTHESIS



Cavanagh and Alvarez (2005)
