

# **PSYC 2530: Attention**

## and the Stroop effect

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# Reminders from last class

There are no textbook chapter readings for this learning module.

# Roadmap

1 Attentional Concepts and Phenomena

2 Stroop Effect

3 Class Experiment

# What is Attention?

*Everybody knows what attention is... - William James*

# What is Attention?

- How we prioritize our mental resources
- How we select relevant from irrelevant information
- How we focus
- How we ignore

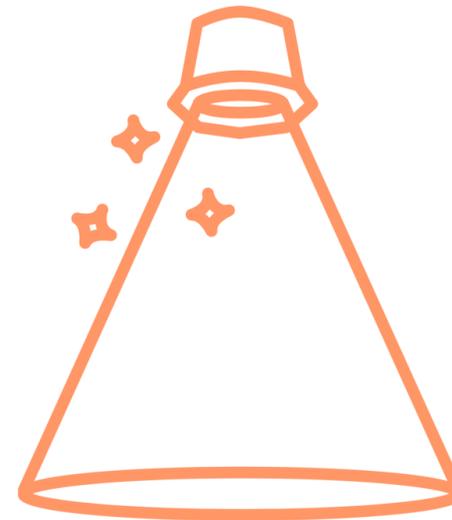
# Metaphors of attention

There are different perspectives on the kinds of processes that are involved in attention abilities

Theories of attention use a variety of metaphors

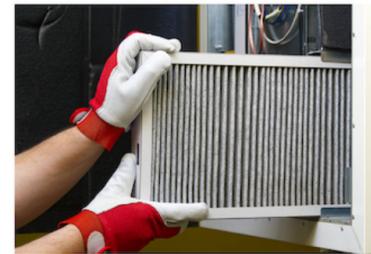
# Spotlight Metaphor

- Attention acts like a spotlight
- Attention shines “extra” cognitive resources on selected information
- Attention highlights attended information



# Filter Metaphor

- Attention acts like a filter
- Attention prevents unwanted information from further cognitive processing



# Attentional Distinctions

## Endogenous Attention

- Internal “orienting” of attention
- Voluntary decision to attend to some information and not others

## Exogenous Attention

- External “orienting” of attention
- Some stimuli automatically cause people to attend to them (e.g., loud noises)

# Controlled vs automatic influences

## Controlled

- Effortful
- Voluntary
- Deliberate
- usually resource limited
- slow

## Automatic

- Effortless
- fast, rapid, ballistic
- Involuntary

# Attentional Theory

There are multiple theoretical frameworks for understanding attention

- (see additional reading on blackboard for a review)
- Strayer, D. A., & Drews, F. A. (2007). Attention. In F. T. Durso (Ed.), *Handbook of Applied Cognition* (2nd Edition, p. 26). John Wiley & Sons, Ltd.

# Attention to Action

Norman and Shallice's **Attention to Action** theory

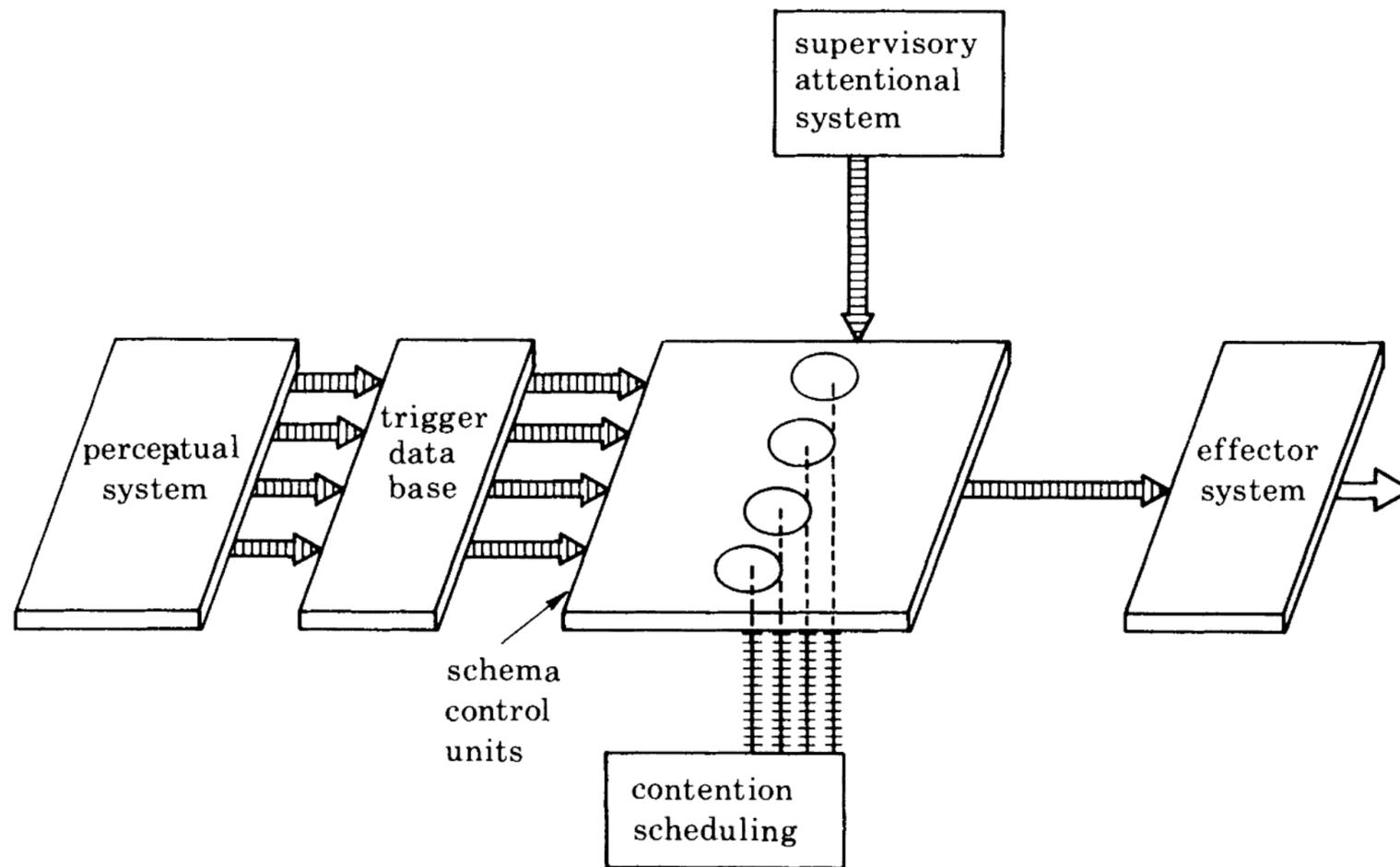


Figure from Shallice, T. (1982). Specific Impairments of Planning. Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences, 298, 199-209.

# S-R learning and Supervisory Attention



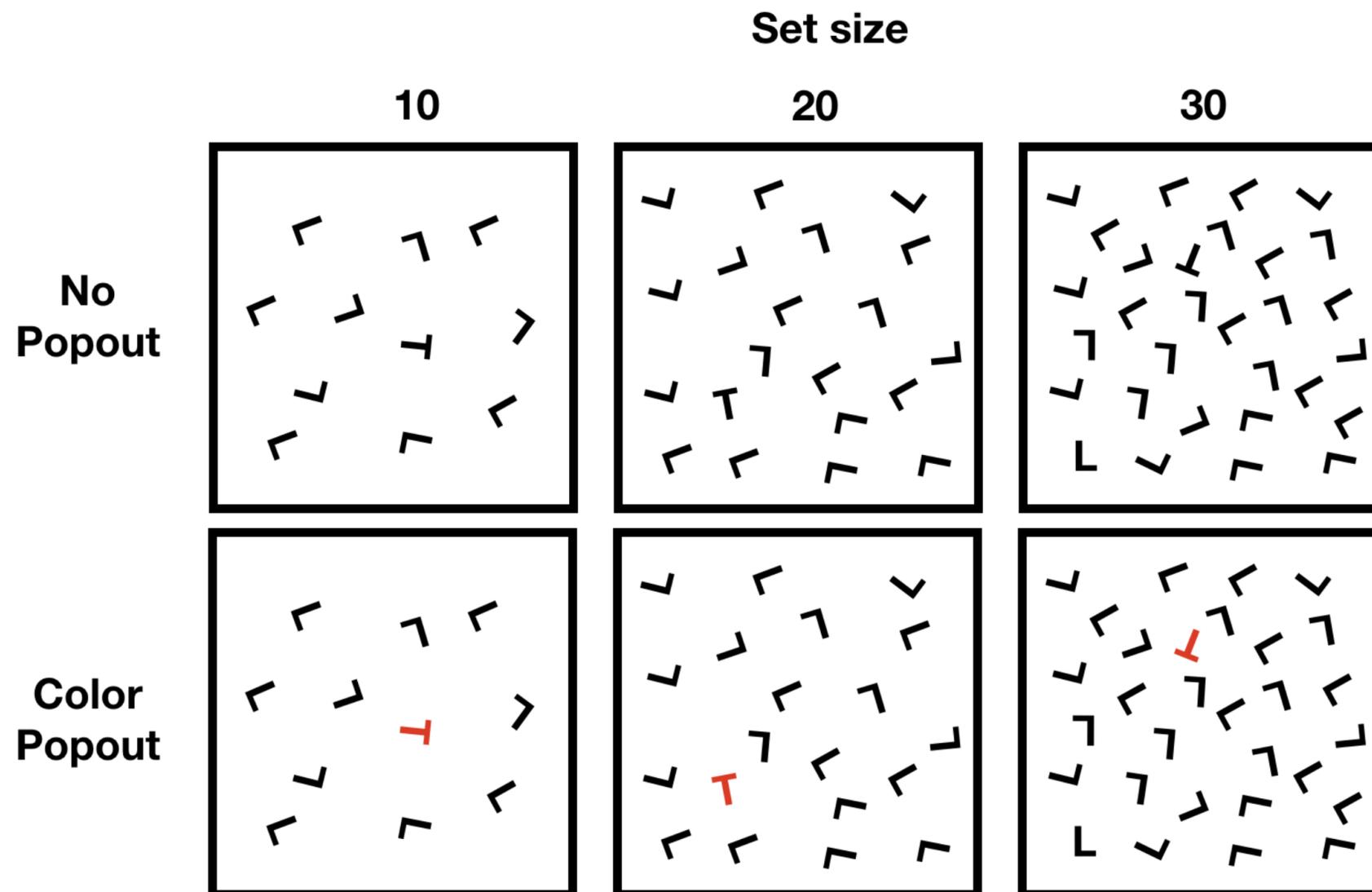
# Attention tasks and phenomena

- Researchers devise laboratory tasks that require attentional processing
- Measures of task performance are used to demonstrate phenomena of attention, and to test theories of attention

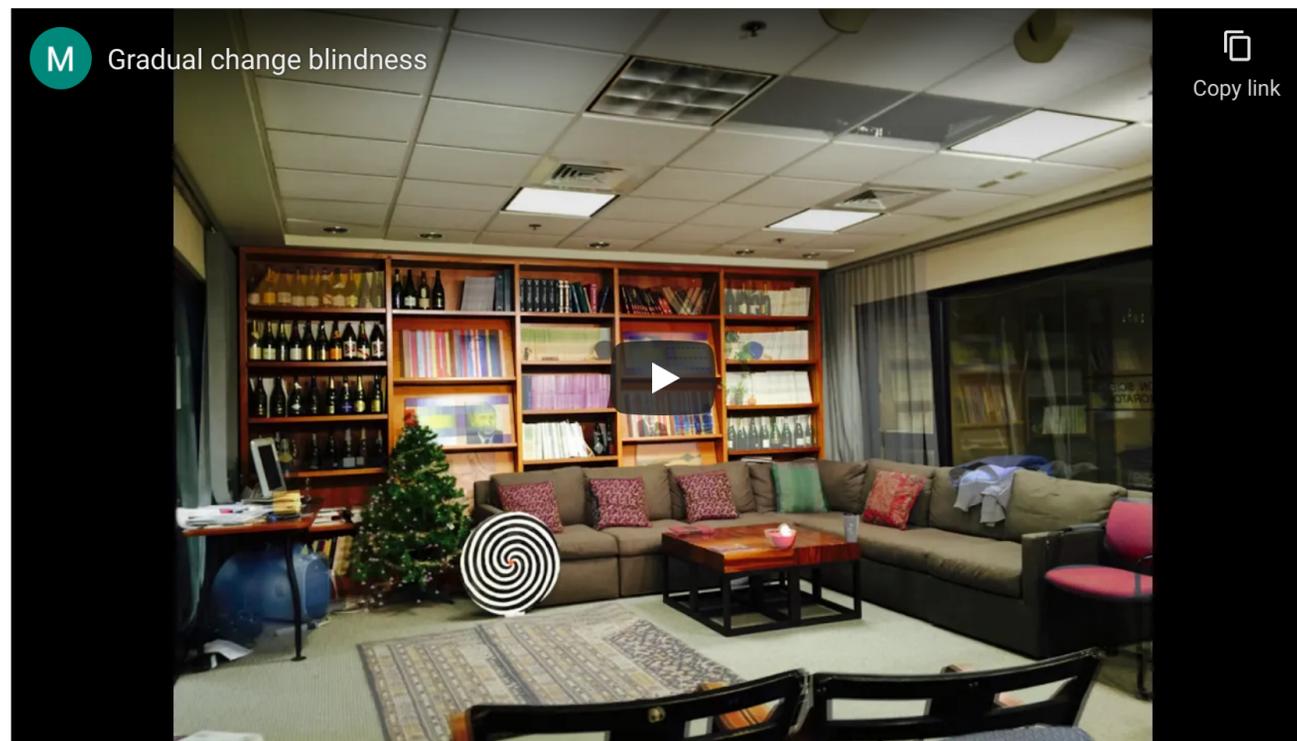
# Some Attentional phenomena

- Cocktail party effect
- Utilization Behavior
- Change Blindness

# Visual Search and pop-out



# Change Blindness

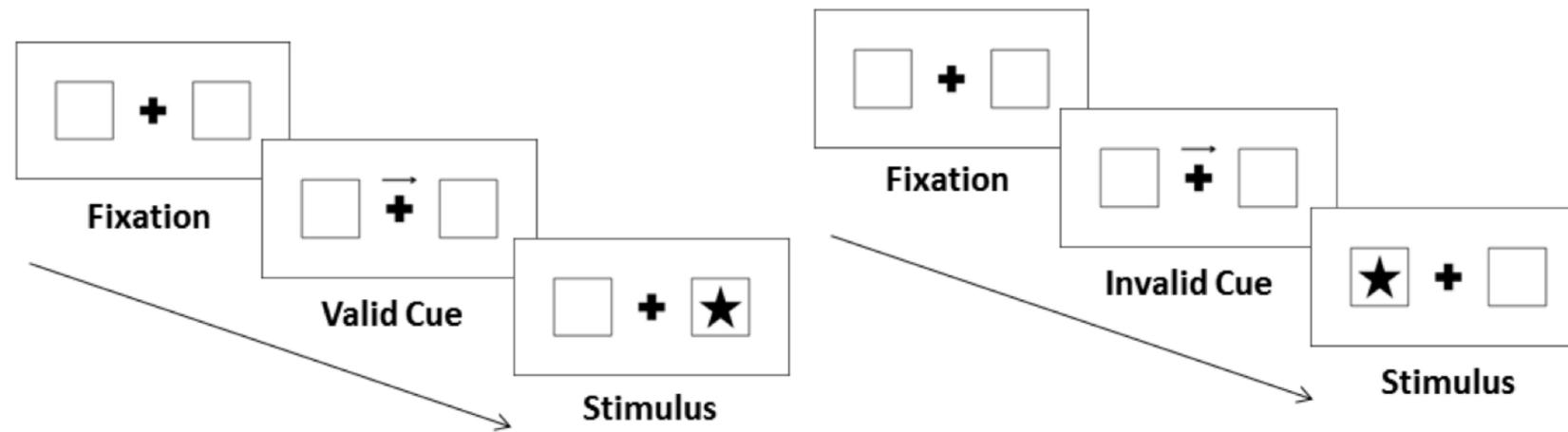


# Attentional Cuing

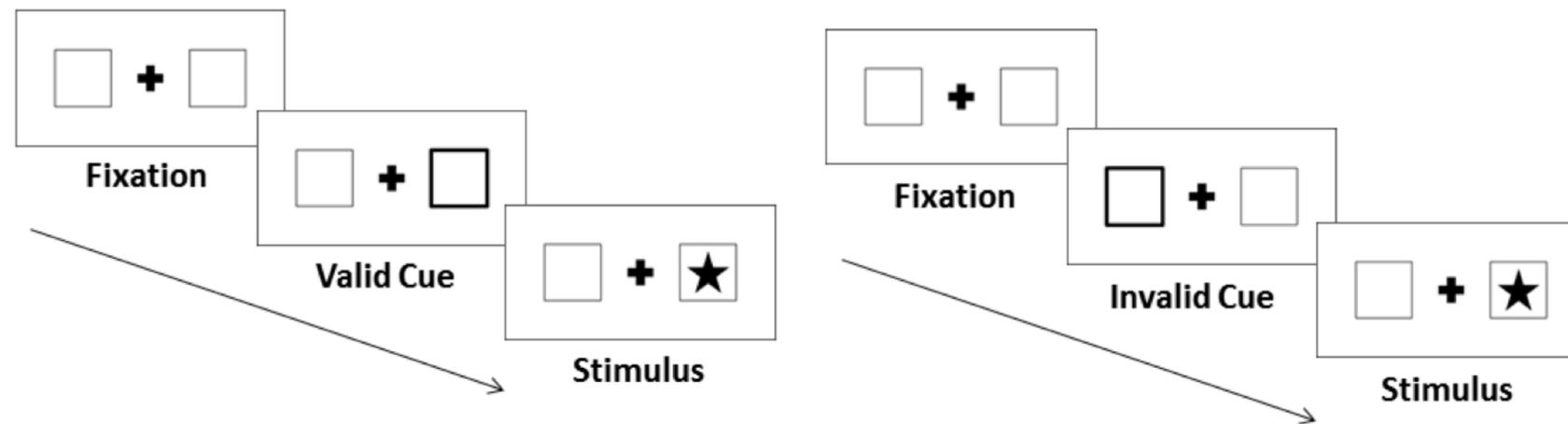
- What are the consequences of attending to something?
- How can we measure what attention does to information processing?

# Posner Cuing task

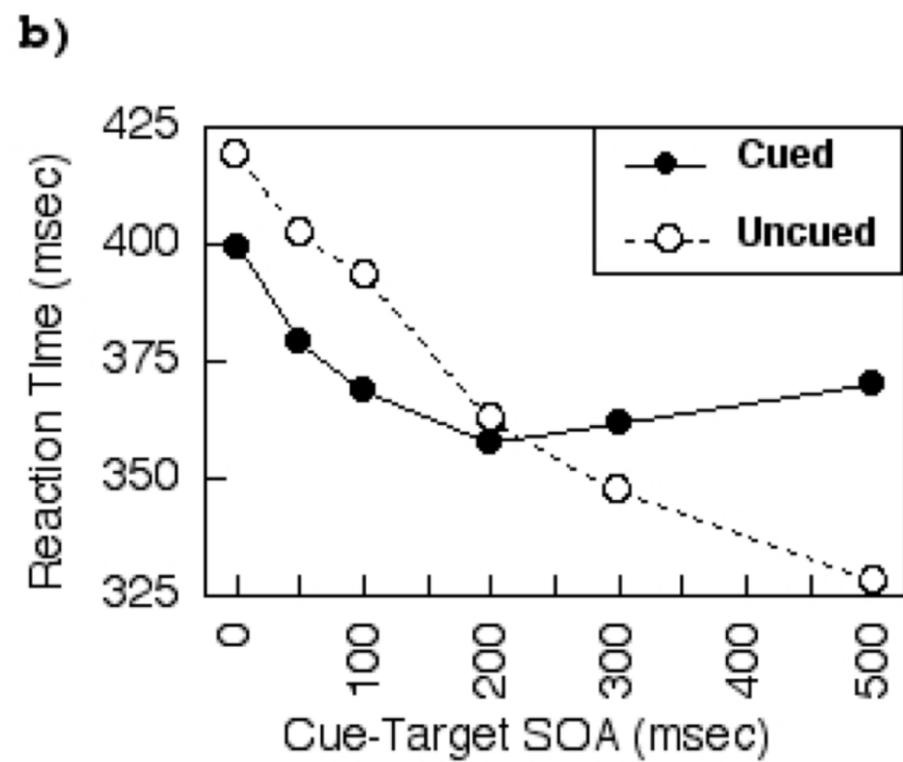
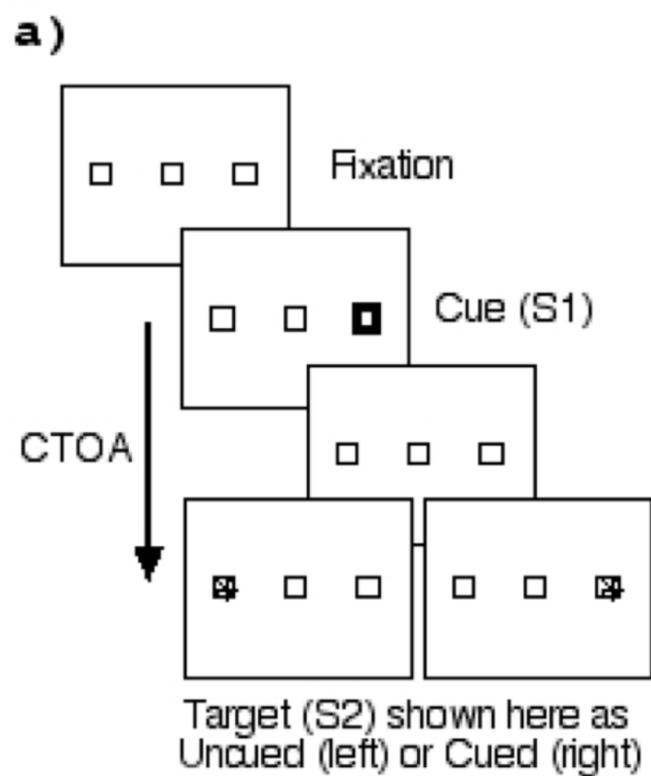
## Endogenous Cues



## Exogenous Cues



# Inhibition of Return



# Roadmap

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# Selective Attention

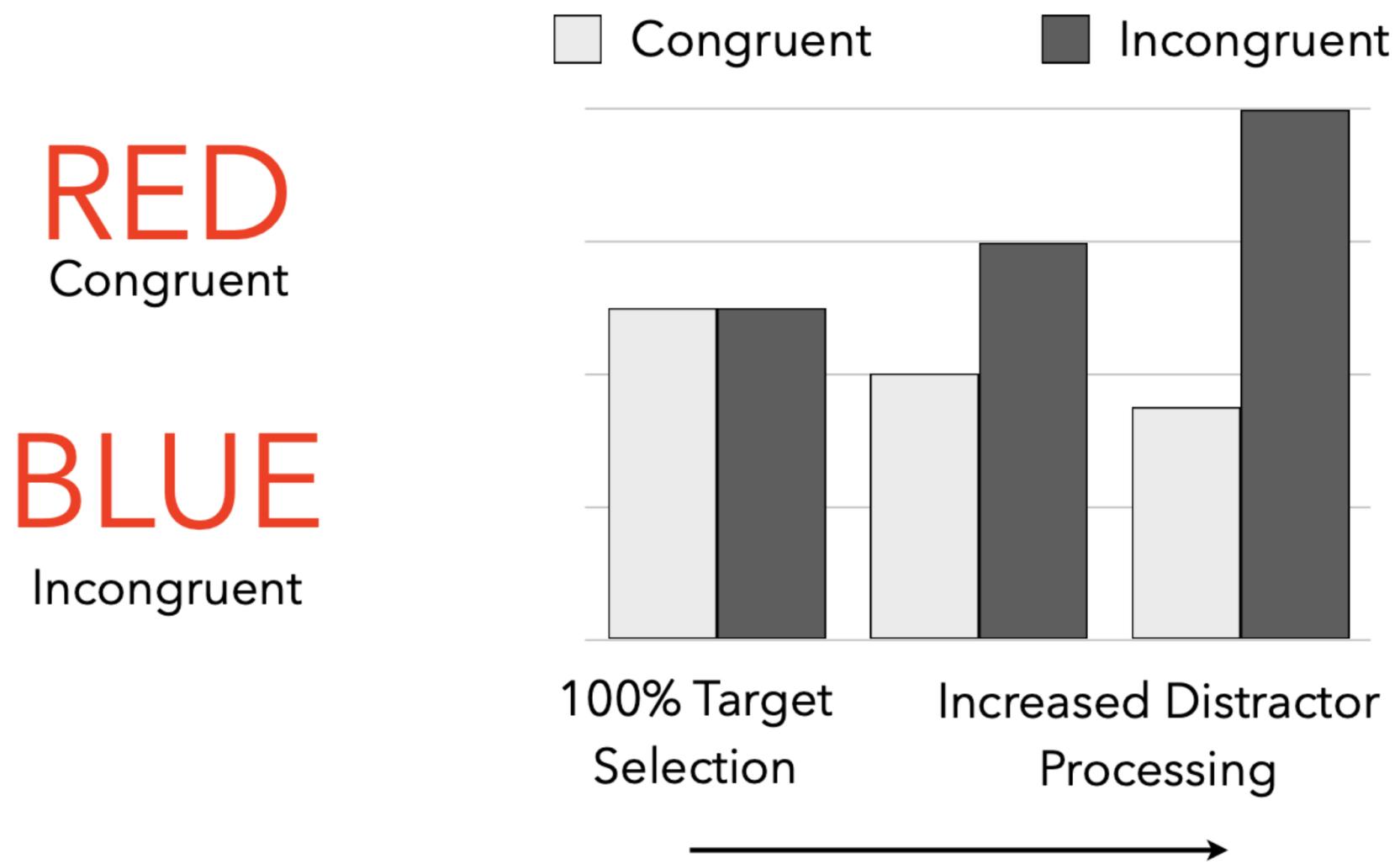
- The ability to “selectively” focus or process task-relevant information
- and ignore or avoid processing task-irrelevant information
- Selective attention abilities are commonly studied in congruency tasks, like the Stroop Task

# Stroop Effect

red  
blue  
green  
yellow  
blue  
red  
green  
red  
blue

red  
blue  
green  
yellow  
blue  
red  
green  
yellow  
blue

# Measuring Selective Attention



# List-wide proportion congruent

75% Congruent  
High PC

Strategy:  
**Increase**  
**Word-**  
**Reading**  
(usually  
helps)

red  
blue  
green  
yellow  
blue  
red  
green  
red  
blue

25% Congruent  
Low PC

Strategy:  
**Decrease**  
**Word-**  
**Reading**  
(usually  
hurts)

red  
blue  
green  
yellow  
blue  
red  
green  
red  
blue

# List-wide proportion congruent results

## Numerous Demonstrations

Shor (1975)

Logan & Zbrodoff (1979)

Lowe & Mitterer (1982)

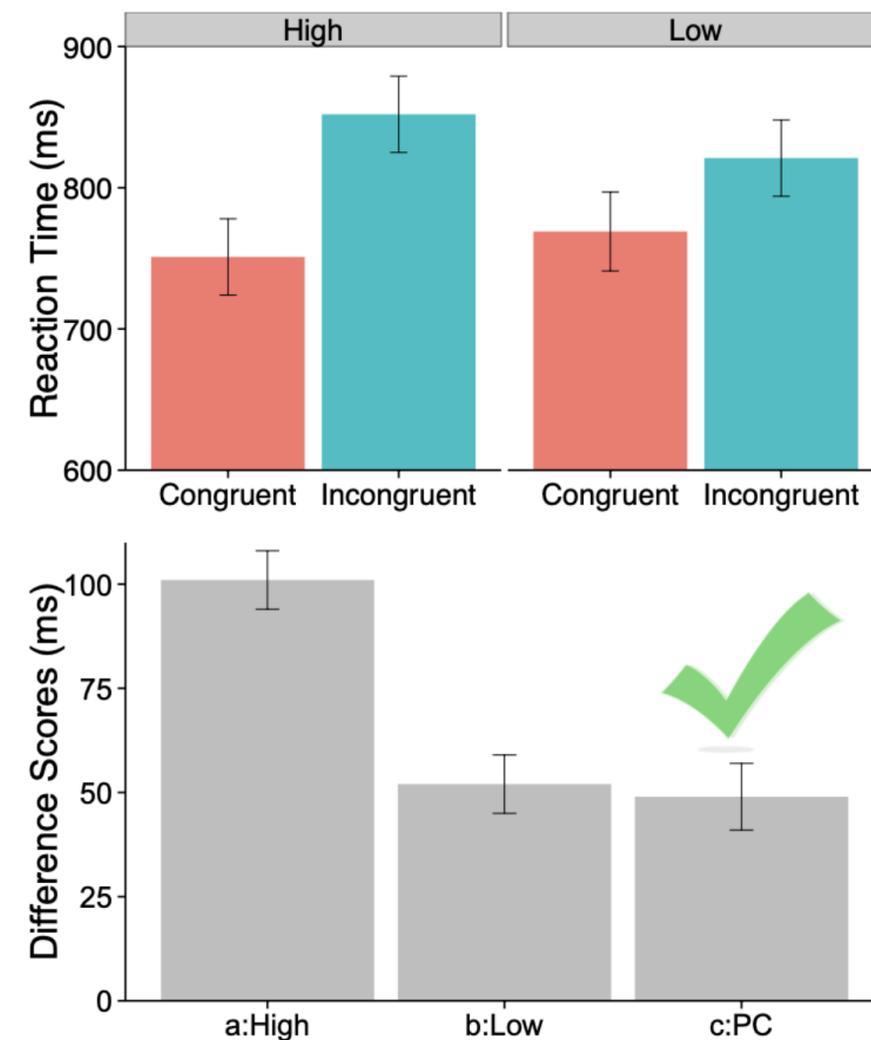
Logan et al. (1984)

Cheesman & Merikle (1986)

Lindsay & Jacoby (1994)

West & Baylis (1998)

Kane & Engle (2003)



# Explanation

- What processes are responsible for the list-wide proportion congruent effect?
- Strategic Account
- Learning Account

# Strategic Account

Participants can predict congruency of upcoming trial

- 75% congruent -> Prepare in advance of trial to attend to word dimension (because it is easy and fast)
- 25% congruent -> Prepare in advance of trial to ignore word dimension

# Learning Account

- Some Stroop items are presented more than others
- RTs are faster for more frequent (more practice) than less frequent items

					
High 75% Congruent	red	9	1	1	1
	green	1	9	1	1
	blue	1	1	9	1
	yellow	1	1	1	9
Low 25% Congruent	red	3	3	3	3
	green	3	3	3	3
	blue	3	3	3	3
	yellow	3	3	3	3

# Processing accounts

- Voluntary Strategies
- Simple stimulus-response learning

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# Testing Voluntary Control

Let's conduct an in-class experiment on the Stroop experiment

# Question

Can people voluntarily control how they attend to word-information?

# Logic

- If people can choose to ignore word information then the Stroop effect should get smaller
- If people can increase their focus on word information then the Stroop effect should get larger

# Instructional Manipulation

## **IGNORE WORD** Instructions

- Tell people to **ignore** word information while they do a Stroop task

## **FOCUS on WORDS**

Instructions

- Tell people to **focus** on word information while they do a Stroop task

# Predictions

- What do we predict will happen?
- What would our results look like in a graph?

# Try it out

Head to the first assignment in this learning module to try out the experiment for yourself.

# What's next

Take the quiz and complete any additional assignments

Next week is the second last module of the term, on language