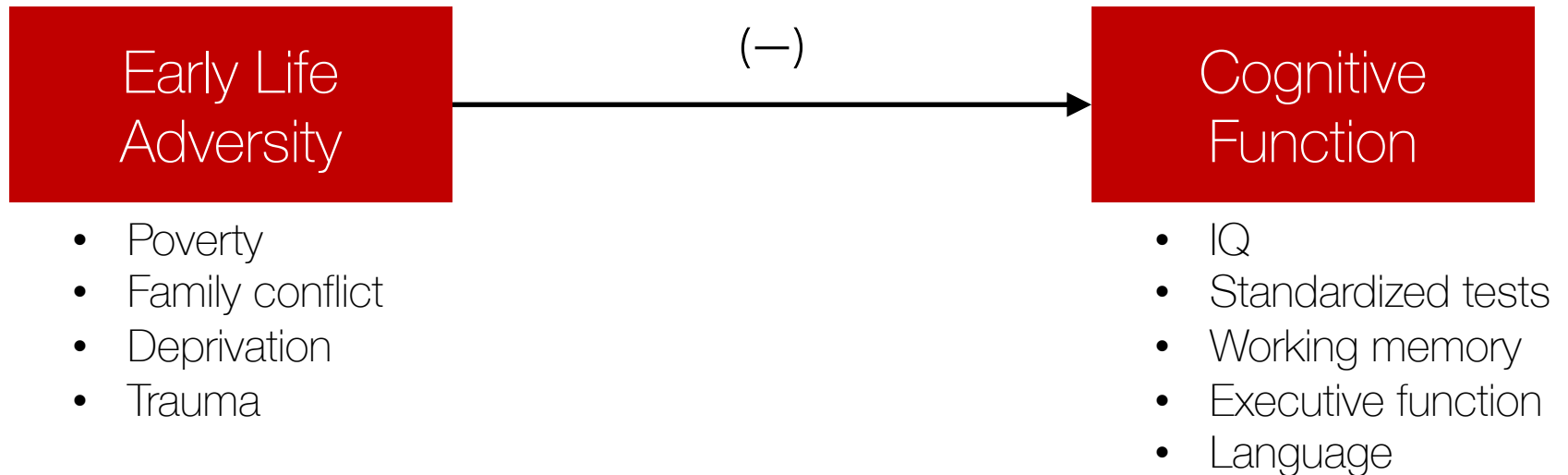

Childhood Unpredictability and Cognitive Abilities

The Sensitized-Specialization Hypothesis

Ethan Young

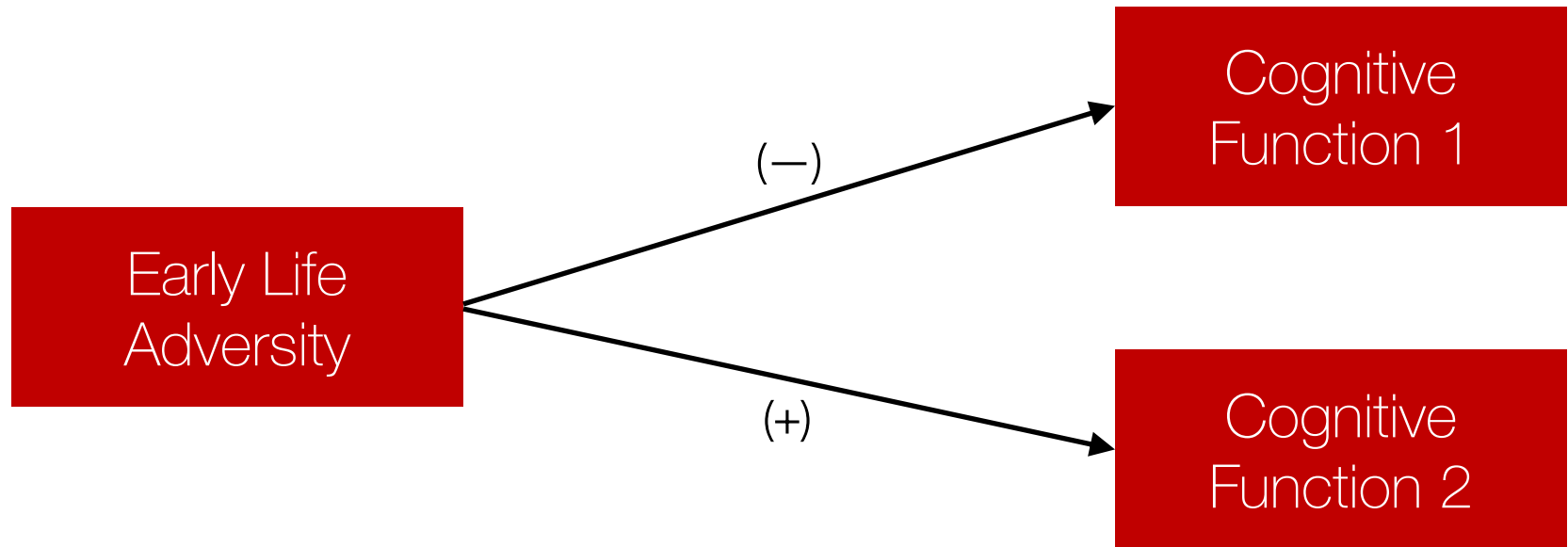
The Deficit Model:



Adaptation-Based Model:

- The Deficit Model presents a one-sided story
- An adaptation-based model suggests cognition is *shaped* by early experiences
- Adverse experiences should *specialize* the mind rather than universally impair it

Adaptation-Based Model:



Early Adversity: Environmental Unpredictability

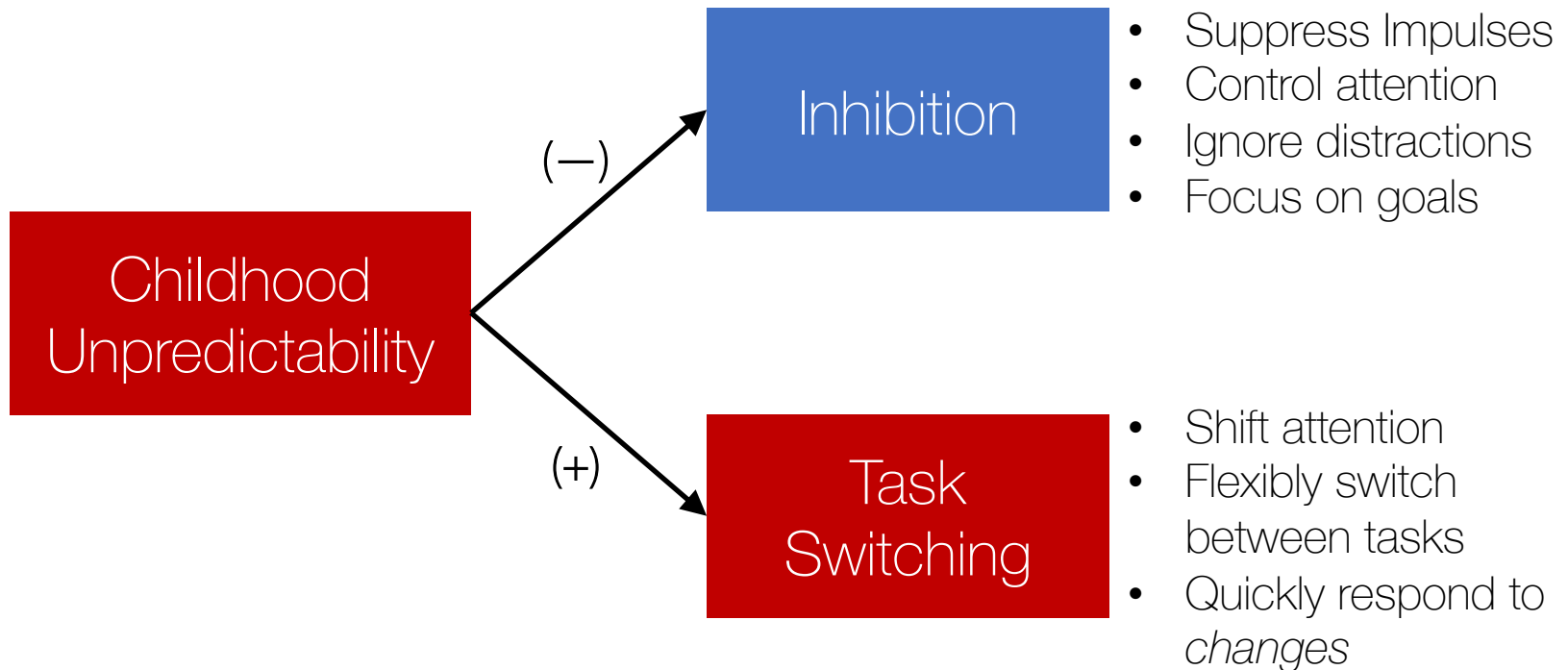
- Unforeseeable environmental fluctuations
- Inconsistency in physical and social environment
- Difficult to predict the future

When I was younger than 10...

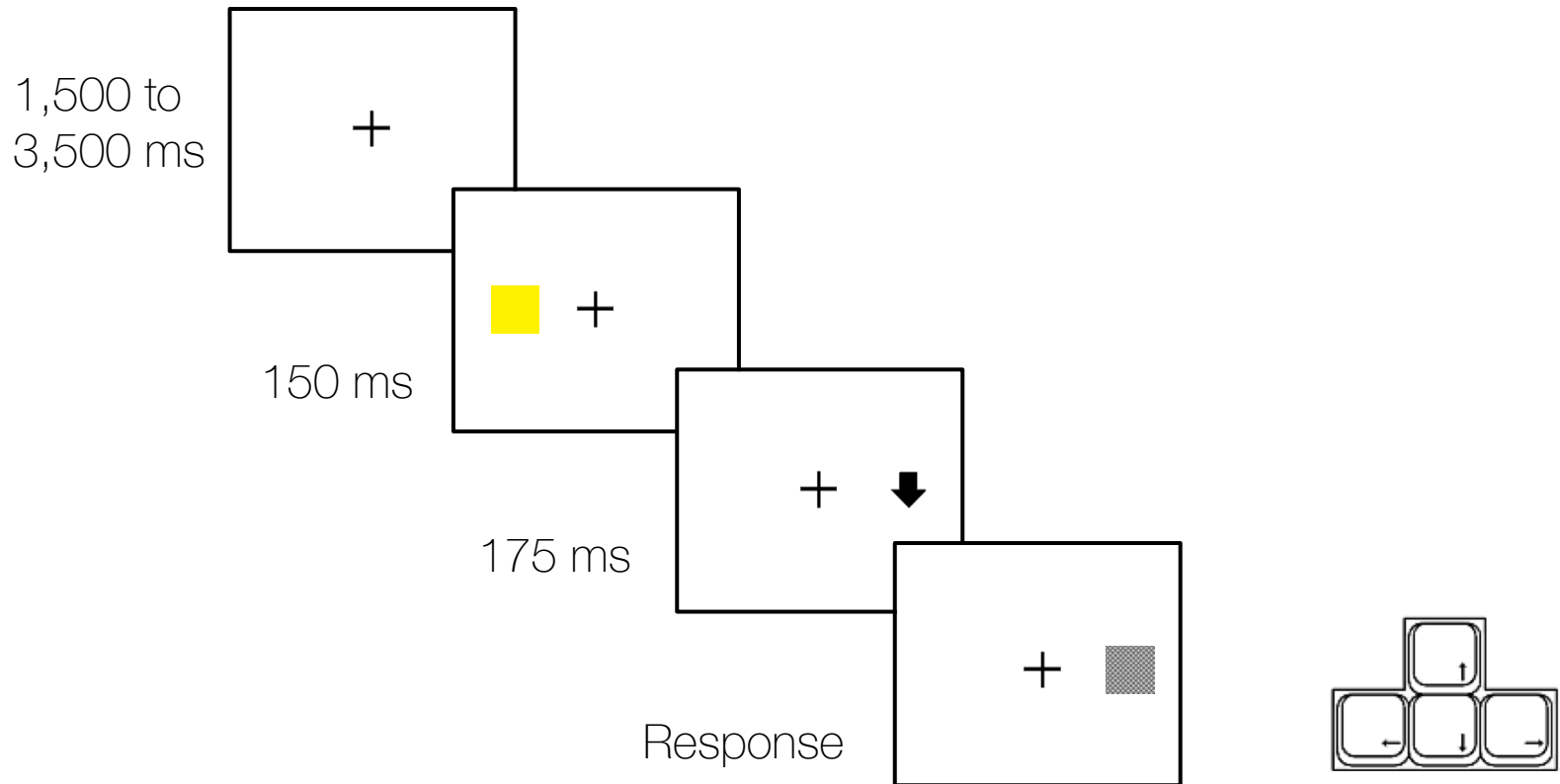
- things were often chaotic in my house
- people often moved in and out of my house on a pretty random basis
- I had a hard time knowing what my parent(s) or other people in my house were going to say or do from day-to-day

Unpredictability & Executive Function

Ability to guide and manage complex behavior toward goals



Inhibition



Task-Switching

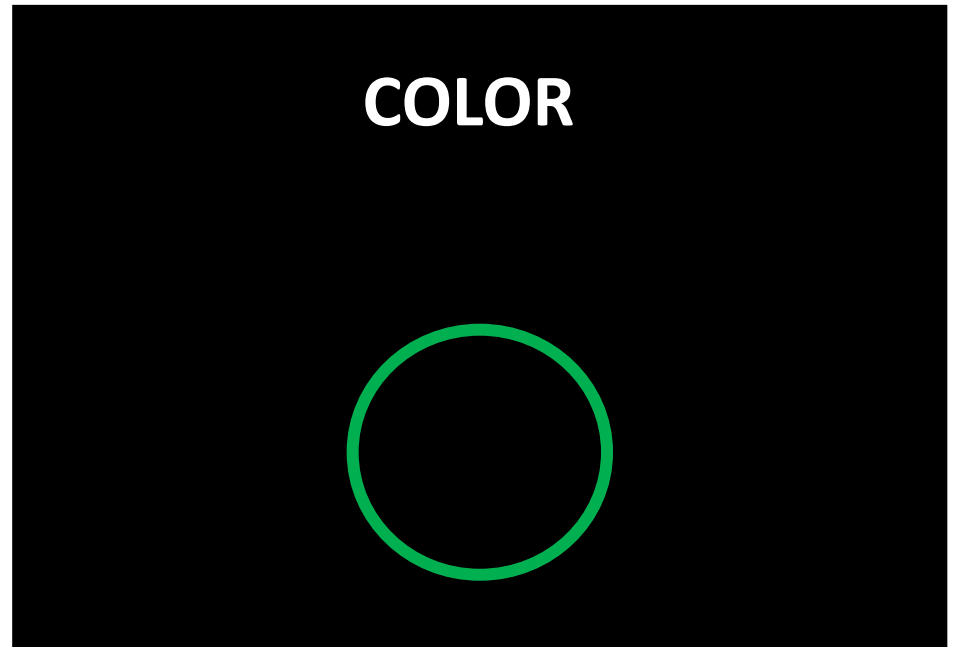
Color or Shape Task

Participant sees
Circle OR Triangle
that is

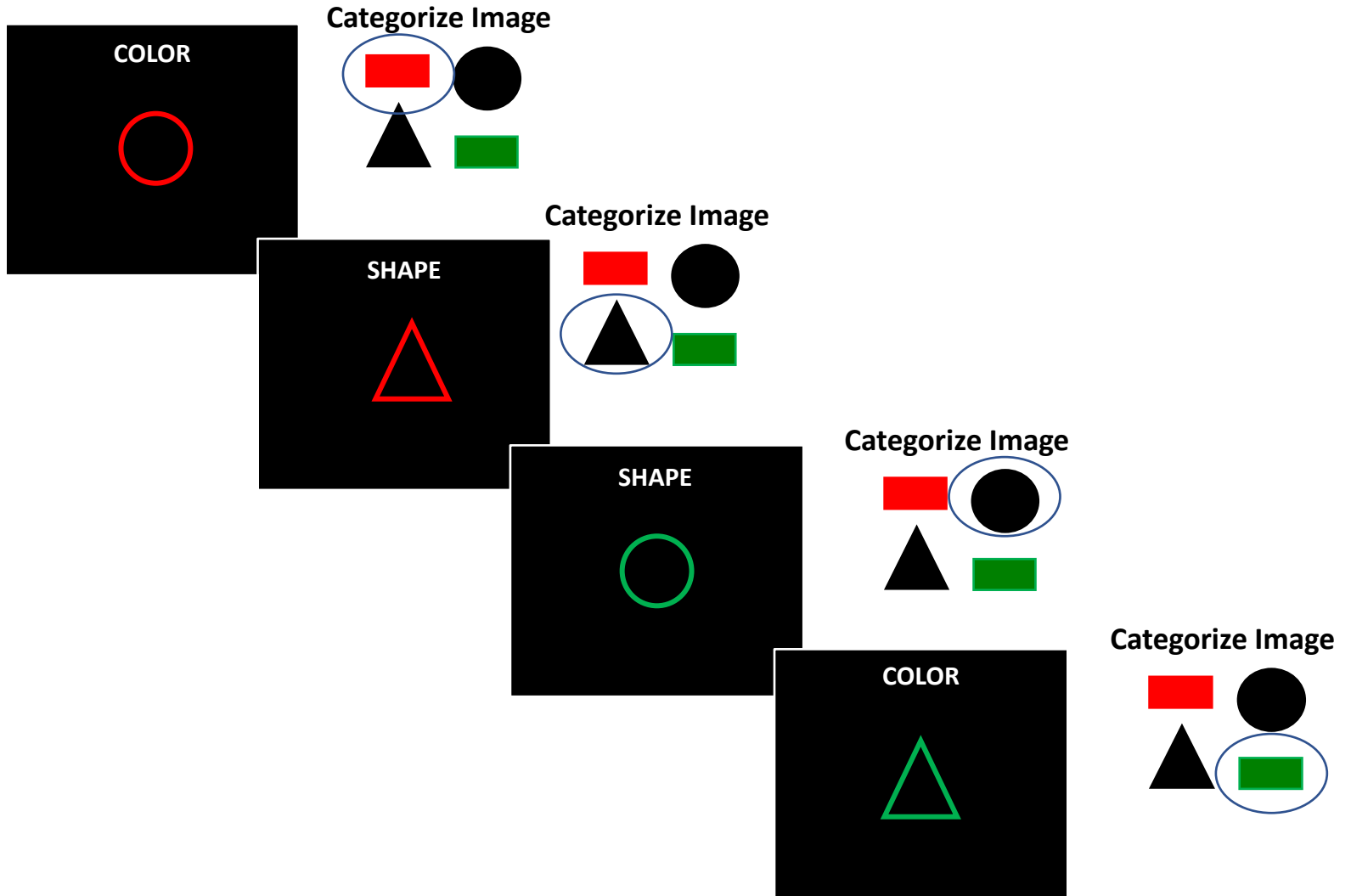
Red OR Green



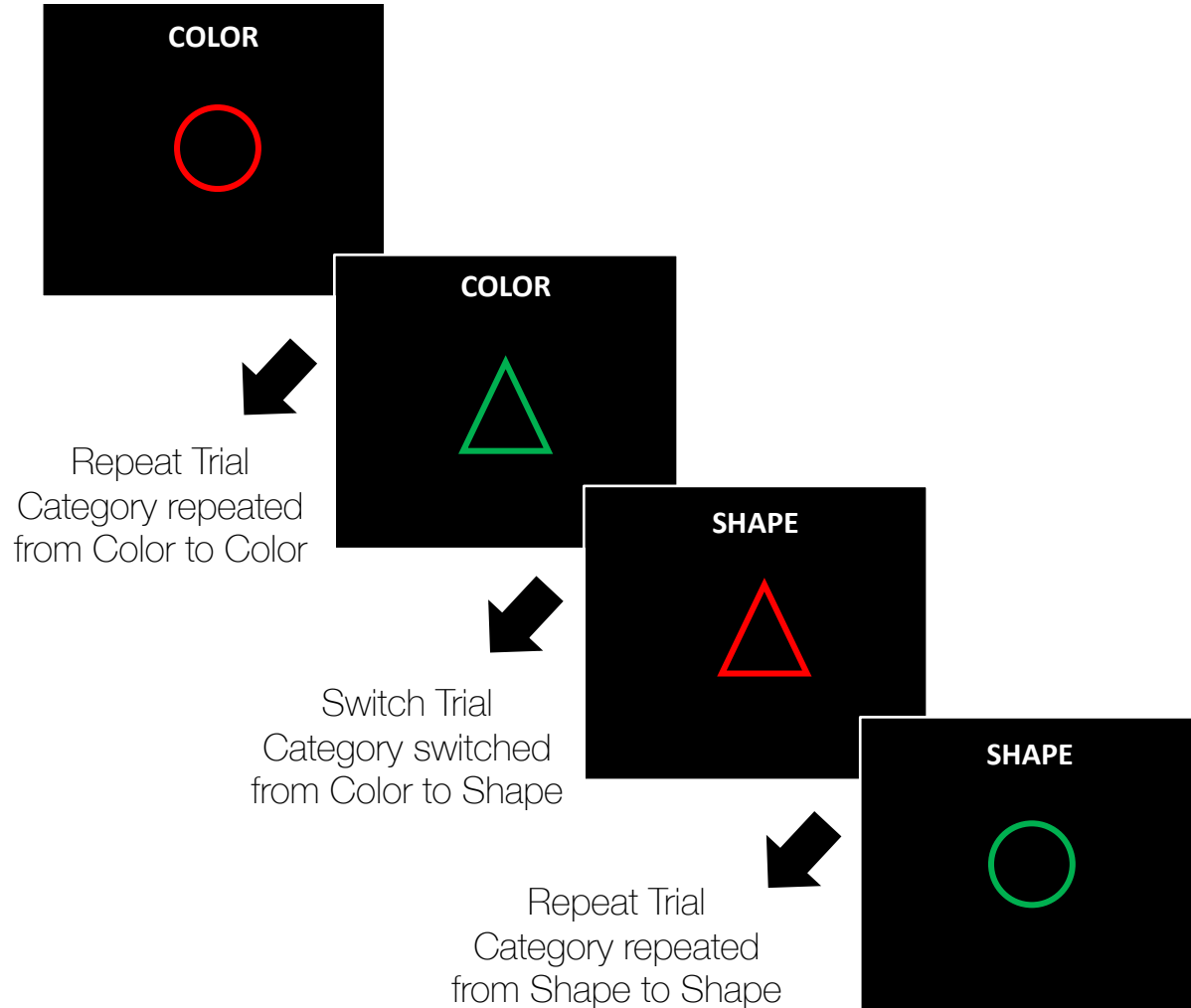
Categorized image
according to
Shape OR Color



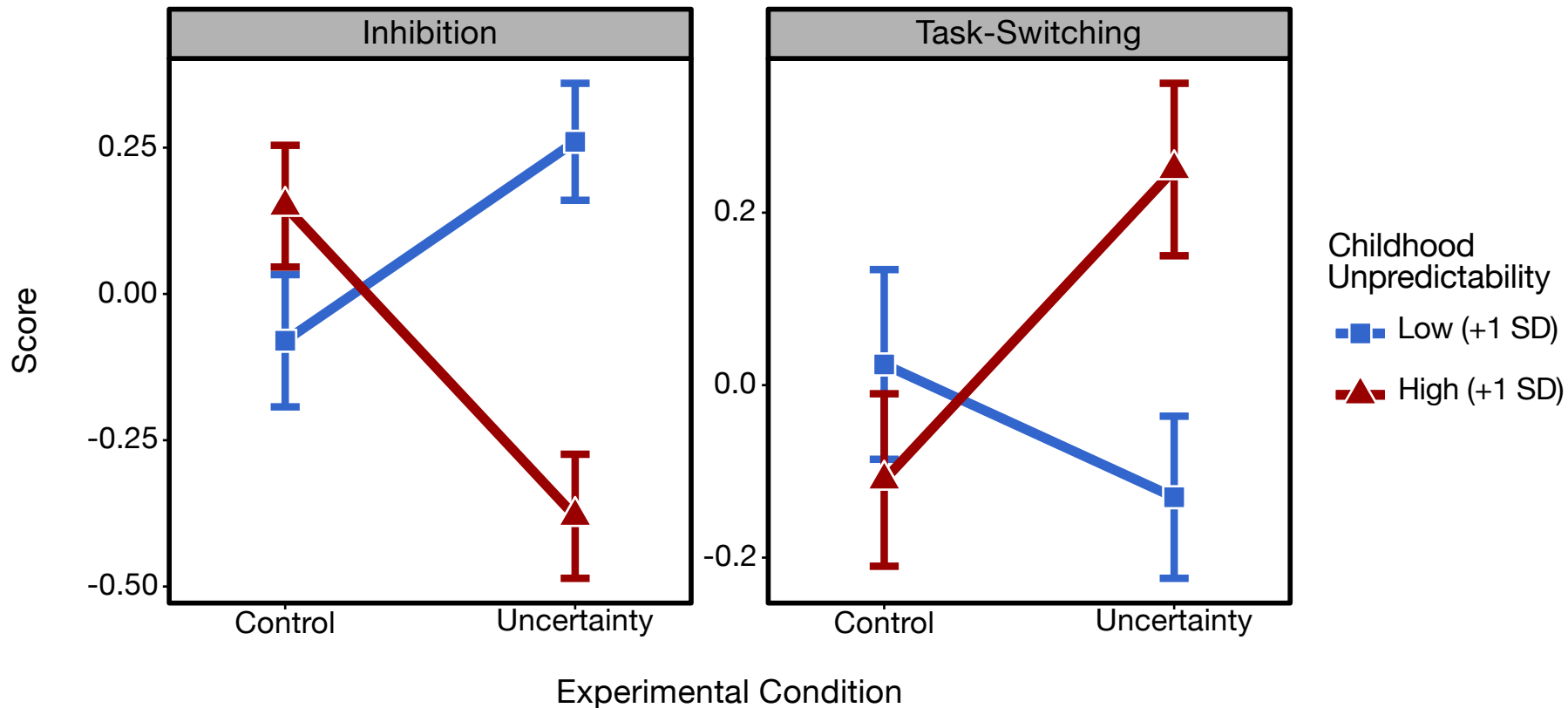
Task-Switching



Task-Switching



Childhood Unpredictability and Executive Functions

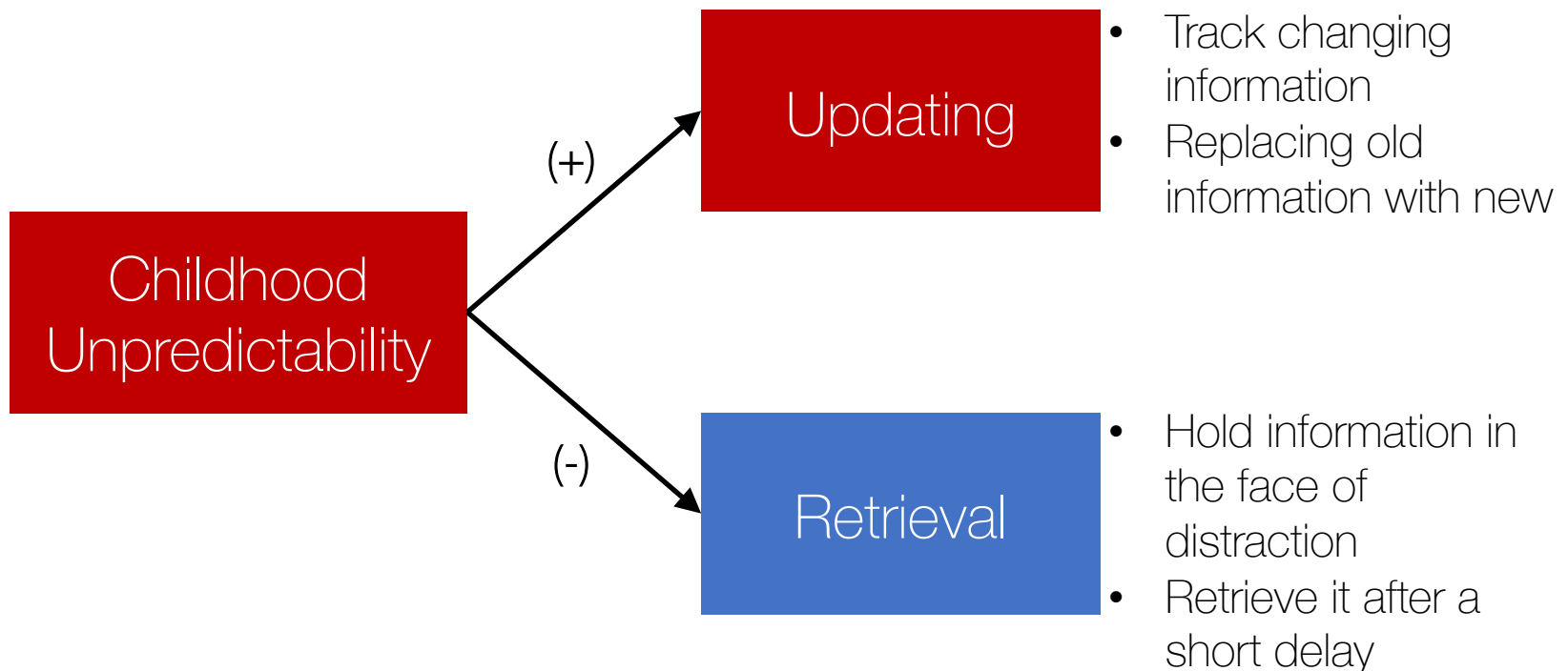


Sensitized-Specialization

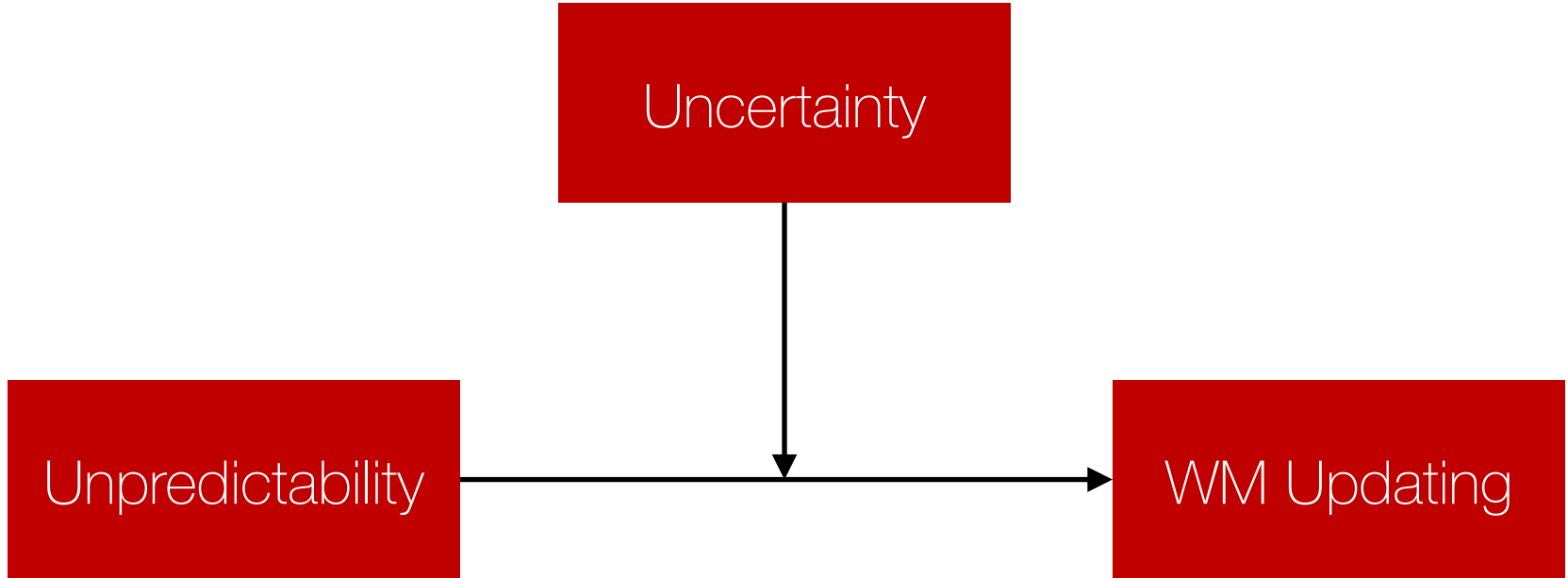
Developmentally specialized abilities become *sensitized* to manifest under particular conditions later in life.

Unpredictability & Working Memory

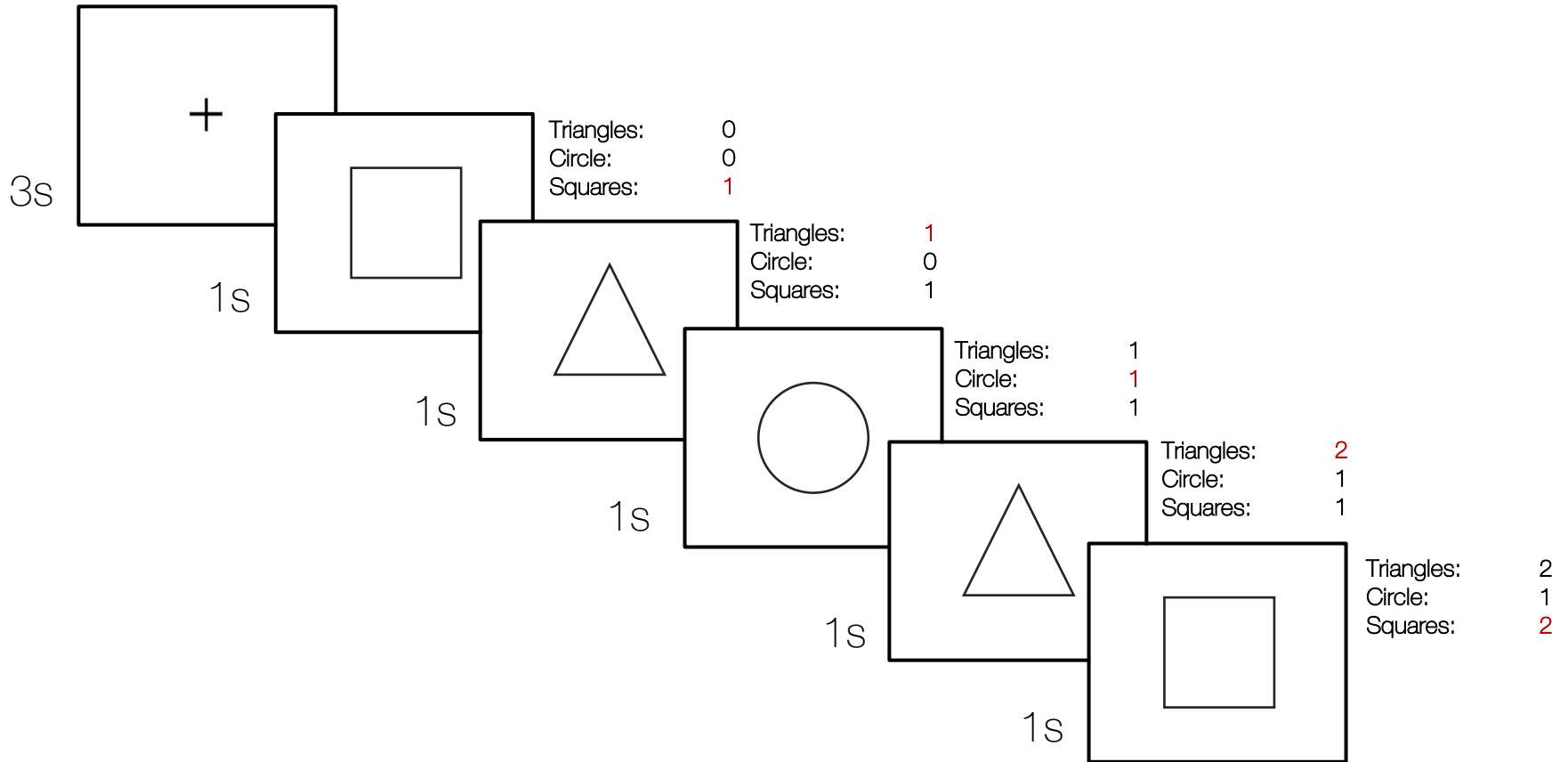
Working memory is a multi-faceted cognitive system designed for interacting with information over relatively short time-periods



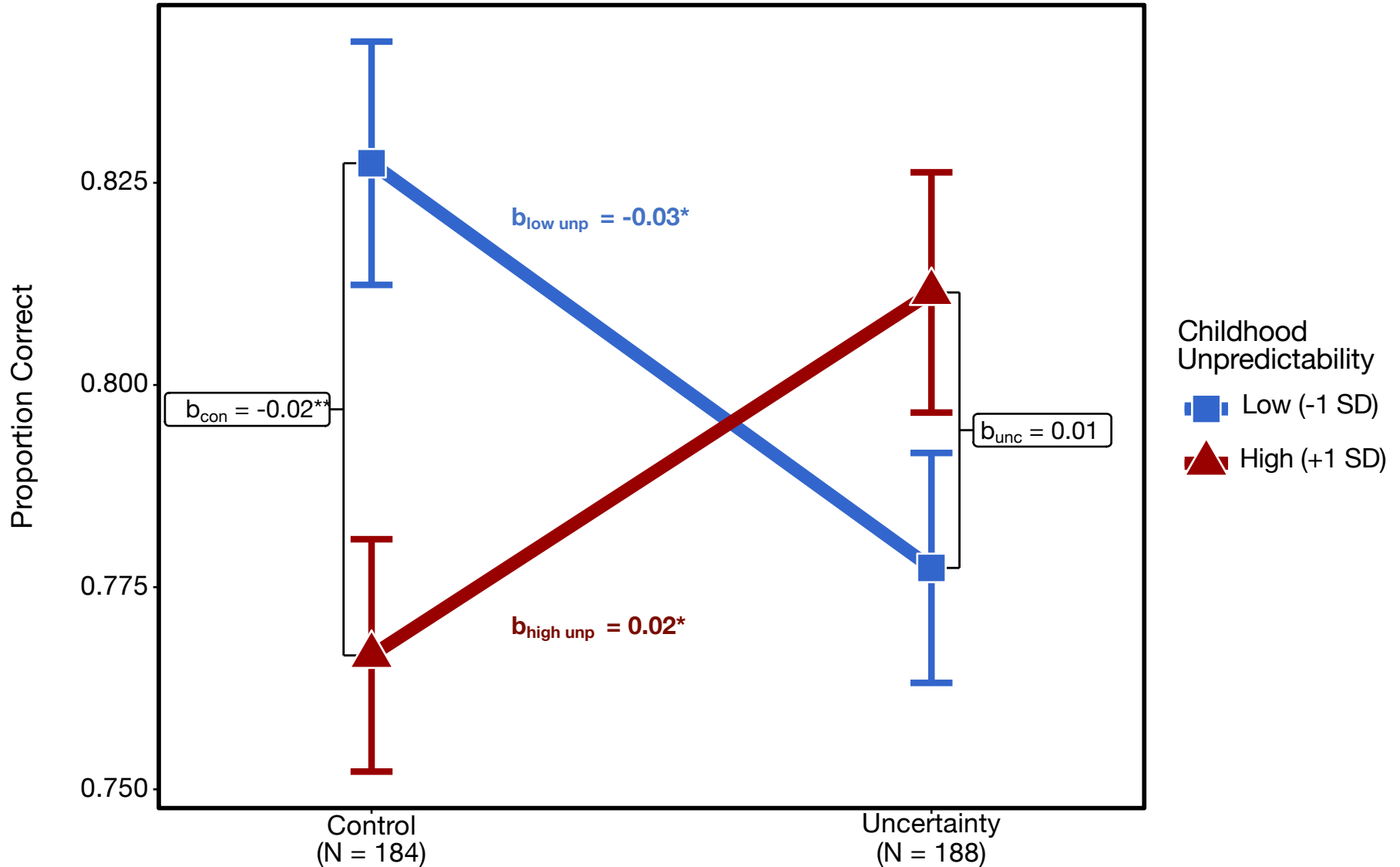
Sensitized-Specialization: Working Memory Updating



Continuous Counters

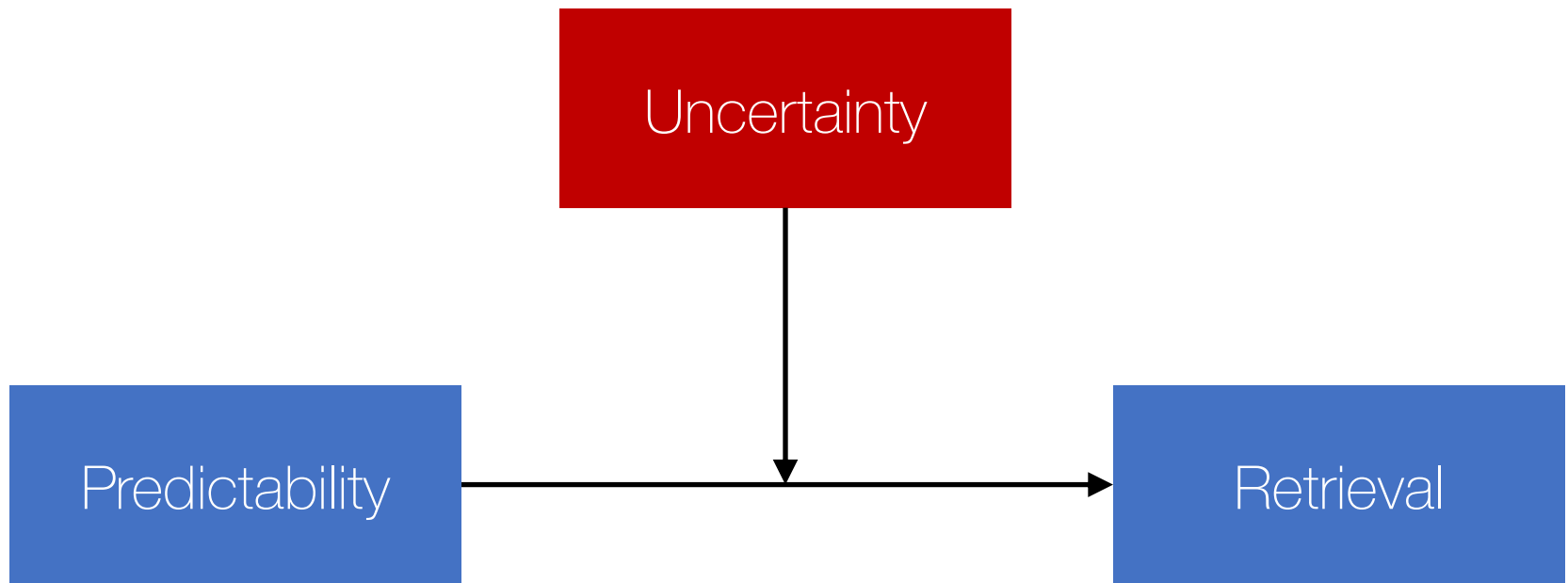


Experiment 1: Working Memory Updating (N=372)

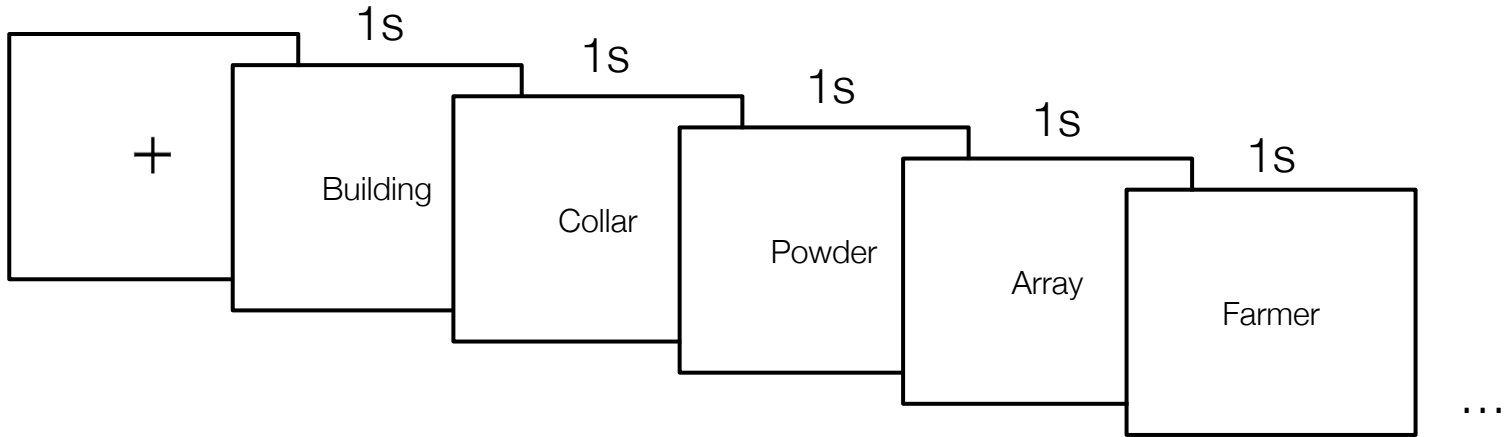


Note: Error bars reflect standard errors.

Sensitized-Specialization: Working Memory Retrieval



WM Retrieval

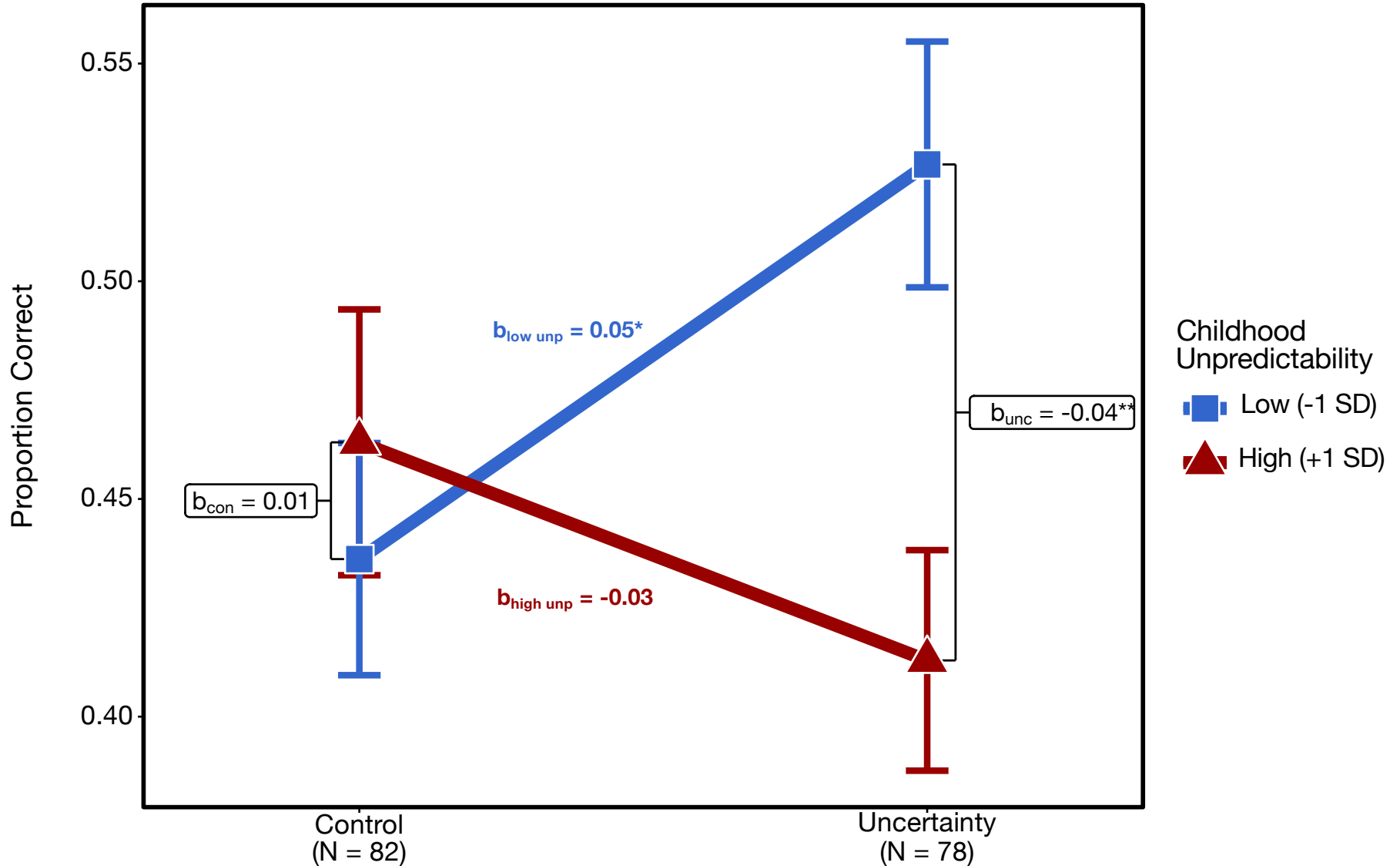


30s { Put the following 3 digit numbers in ascending order.

146	562	971	236	702	784	468	865
-----	-----	-----	-----	-----	-----	-----	-----

Recall
(any order)

Experiment 2: Working Memory Retrieval (N=160)



Note: Error bars reflect standard errors.

Summary

Predictable Environments

- Adapting to the same challenges across time and space
- Inhibition
- Working Memory Retrieval

Unpredictable Environments

- Adapting to different challenges across time and space
- Task-Switching
- Working Memory Updating

Sensitized-Specialization

- Specialized abilities are context specific
- Cues of environmental uncertainty bring specialized cognitive abilities online
- *Both* unpredictable and predictable childhood environments show evidence for sensitized-specialization

Limitations and Future Directions

- Longitudinal data (ideally genetically informed) data are needed to appropriately test these questions
- Why are some abilities sensitized and specialized?
 - What is the mechanism behind uncertainty primes?
 - What are the psychological, physiological, and/or affective mechanisms responsible for sensitization?
- Is there a more general “stress-adapted cognitive phenotype” that is shaped by early adversity?

Thank You
