Are Intuitions and Embodied Experiences for Regaining Balance Aligned?

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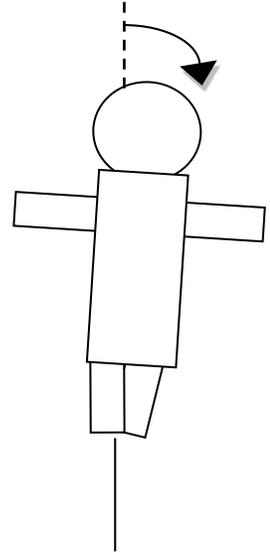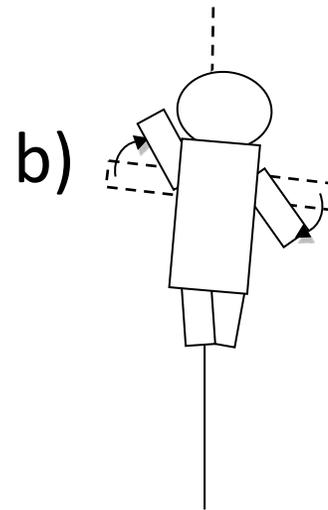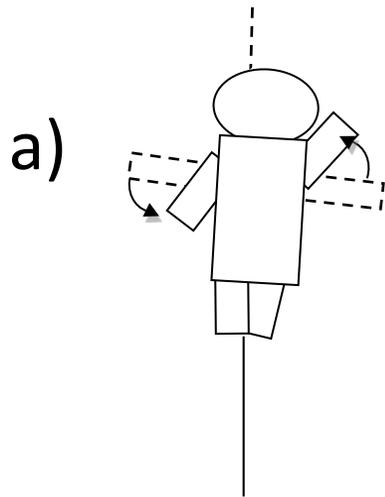
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Let's start with a question for the audience

A person is balancing on a balance beam. You're looking from behind so that both of you are facing the same direction. The person starts to fall to the right as indicated in the diagram.

Which way does the person need to swing their arms to regain balance?

a)

b)

In case you haven't figured it out...this is a study about balancing on a balance beam

Theoretical perspective: Embodied Cognition

- Embodied cognition is a theory suggesting that conceptual understanding is grounded in embodied experiences and that the relationship between the body and the external world is central to processes of thinking and reasoning

- The BIG QUESTION we were interested in investigating:
  Is intellectual knowledge linked to embodied knowledge for balancing on a balance beam?
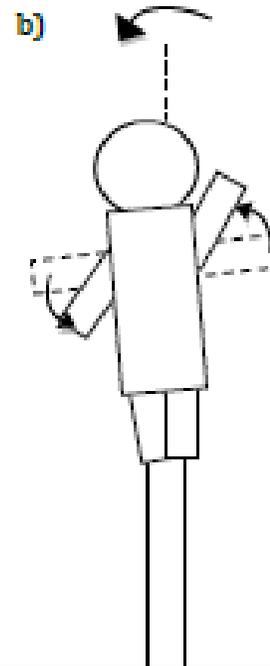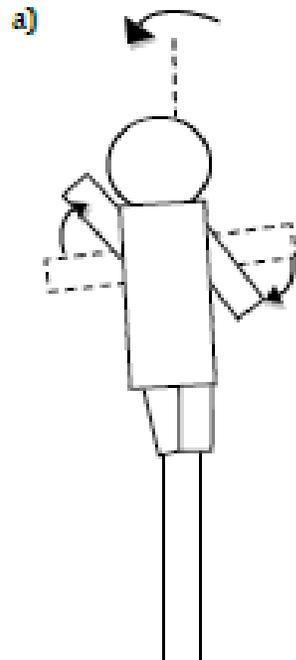
More specifically:

- What are people's preconceived notions about balancing on a balance beam (we will call this "intellectual knowledge")?
- Can people correctly recall which way their arms swing to regain their balance after doing a balancing activity?
- Does asking a question that elicits intellectual knowledge **BEFORE** doing a balancing activity affect individuals' ability to correctly recall which way their arms swing to regain their balance?
- Does asking a question that elicits intellectual knowledge **AFTER** doing a balancing activity, but **BEFORE** recall affect individuals' ability to correctly recall which way their arms swing to regain their balance?
- Does imagery help accurate recall? (i.e., closing eyes and imagining oneself back on the balance beam with arms out)
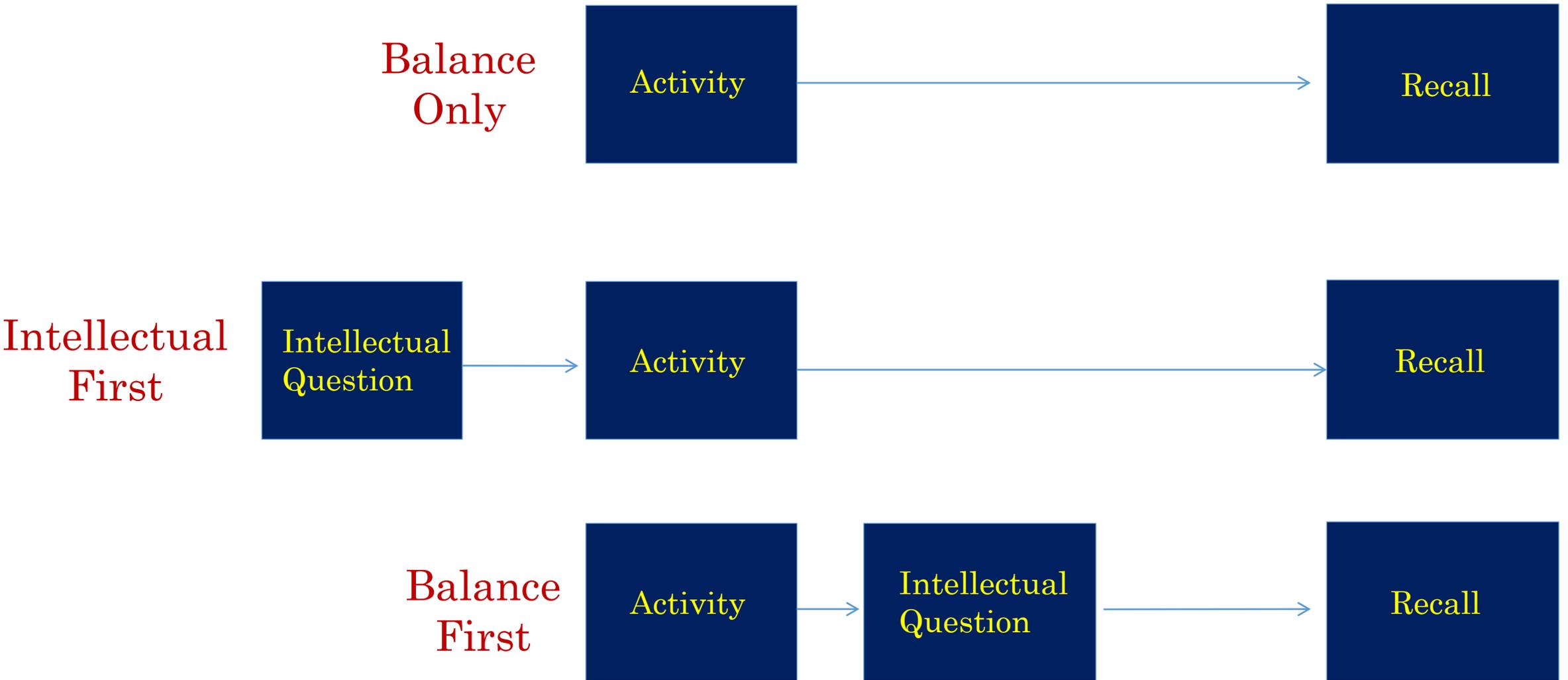
Recall question

You were just on the balance beam. The diagrams below show a view from the back. At one point, you started to fall to the left. When that happened, which way did you swing your arms to maintain your balance?

a)

b)

Experiment 1 Procedure: 3 conditions

Balance Only → [Activity] ────────────→ [Recall]

Intellectual First [Intellectual Question] → [Activity] ────────→ [Recall]

Balance First [Activity] → [Intellectual Question] → [Recall]
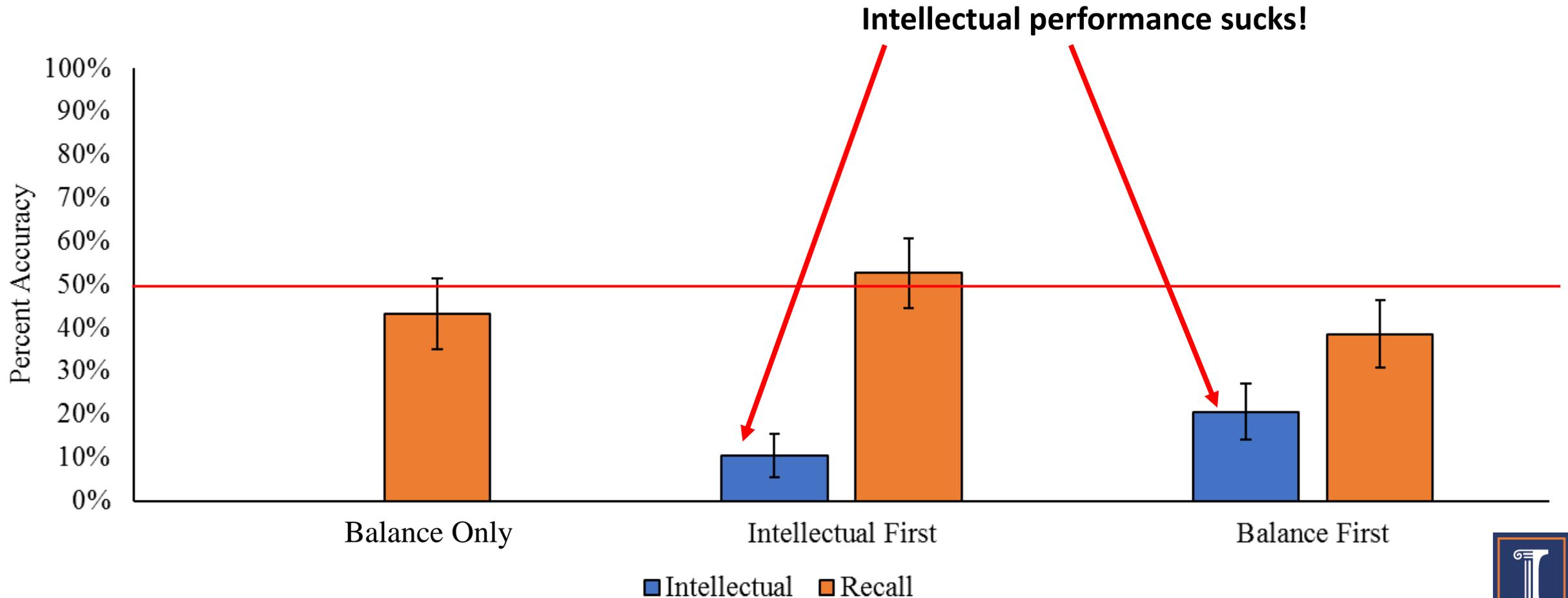
Subjects: 110 physics-naïve participants from the ed psych pool

Results

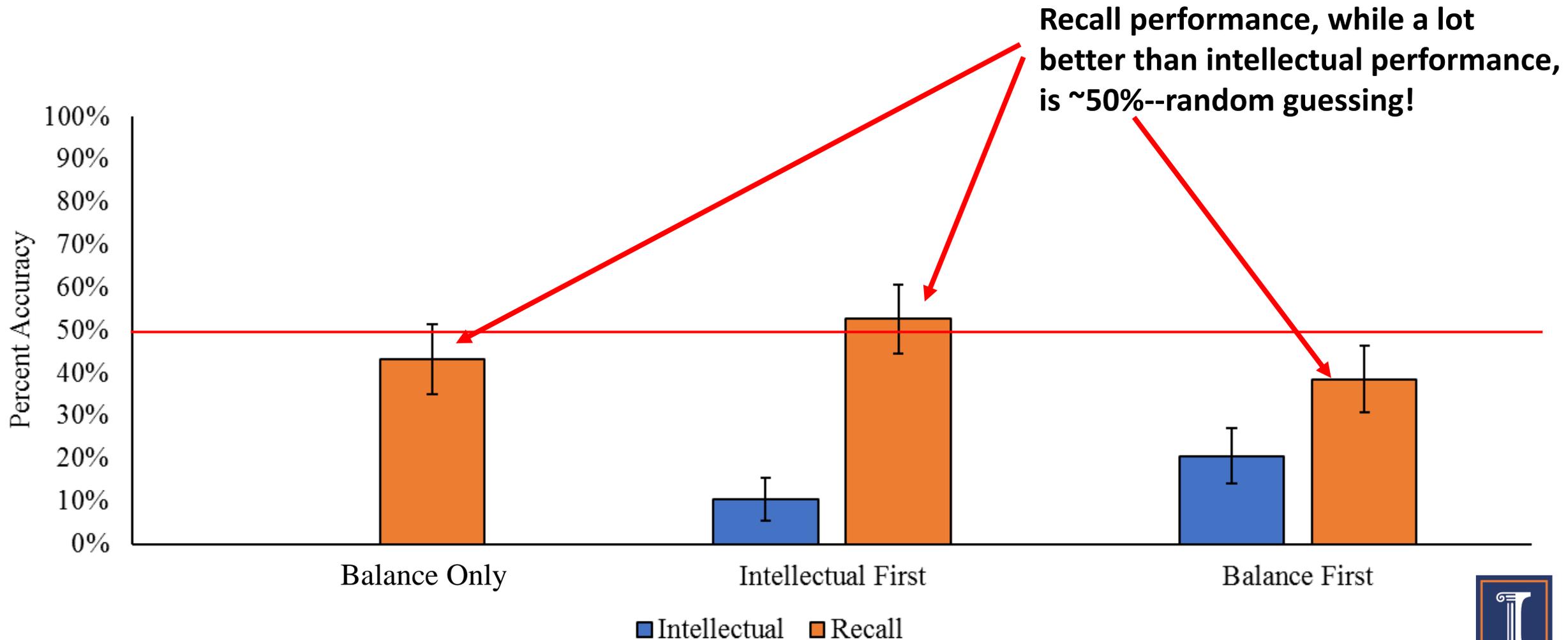## Accuracy at answering intellectual and recall questions

Results

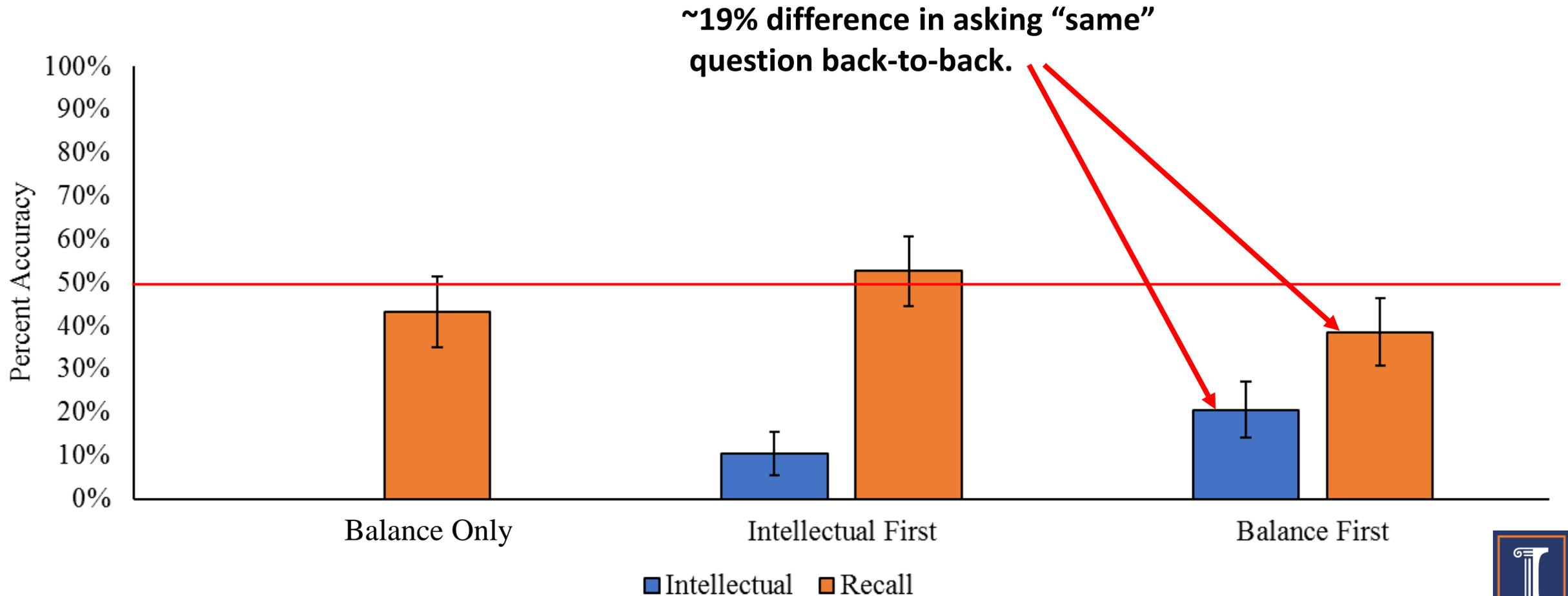## Accuracy at answering intellectual and recall questions

Results

Accuracy at answering intellectual and recall questions

Experiment 2 Procedure: 3 conditions

Balance Only

Activity → Imagery → Recall

Intellectual First

Intellectual Question → Activity → Imagery → Recall

Balance First

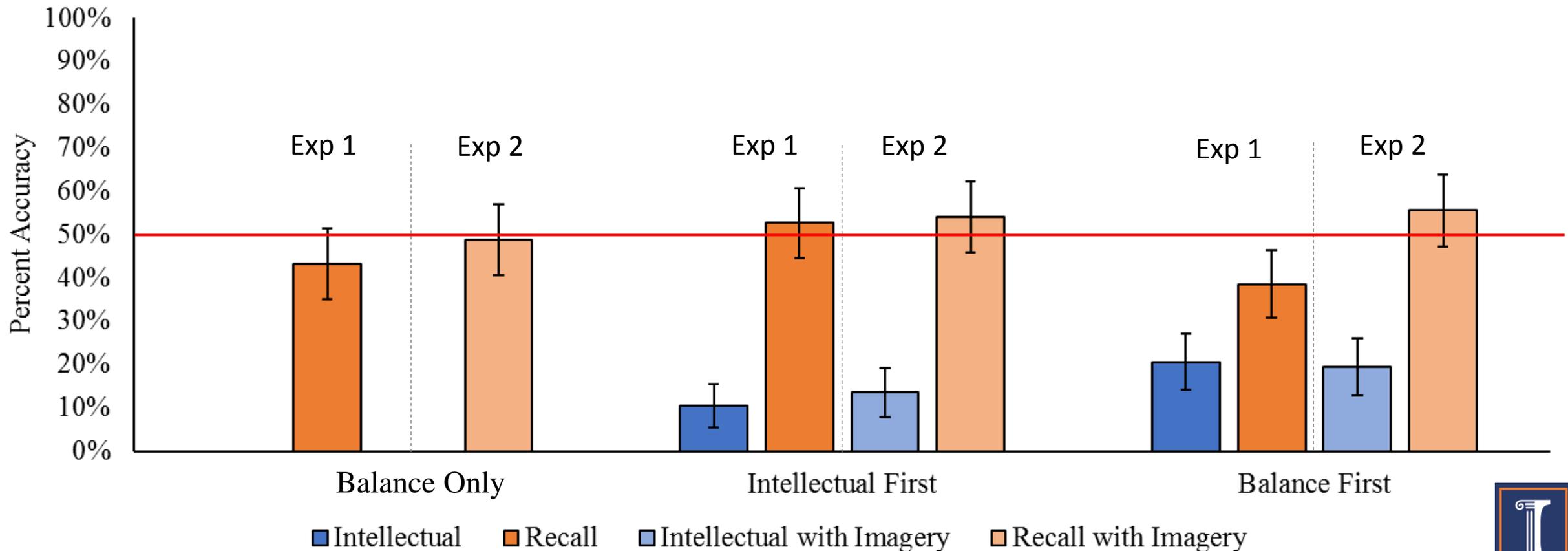Activity → Intellectual Question → Imagery → Recall
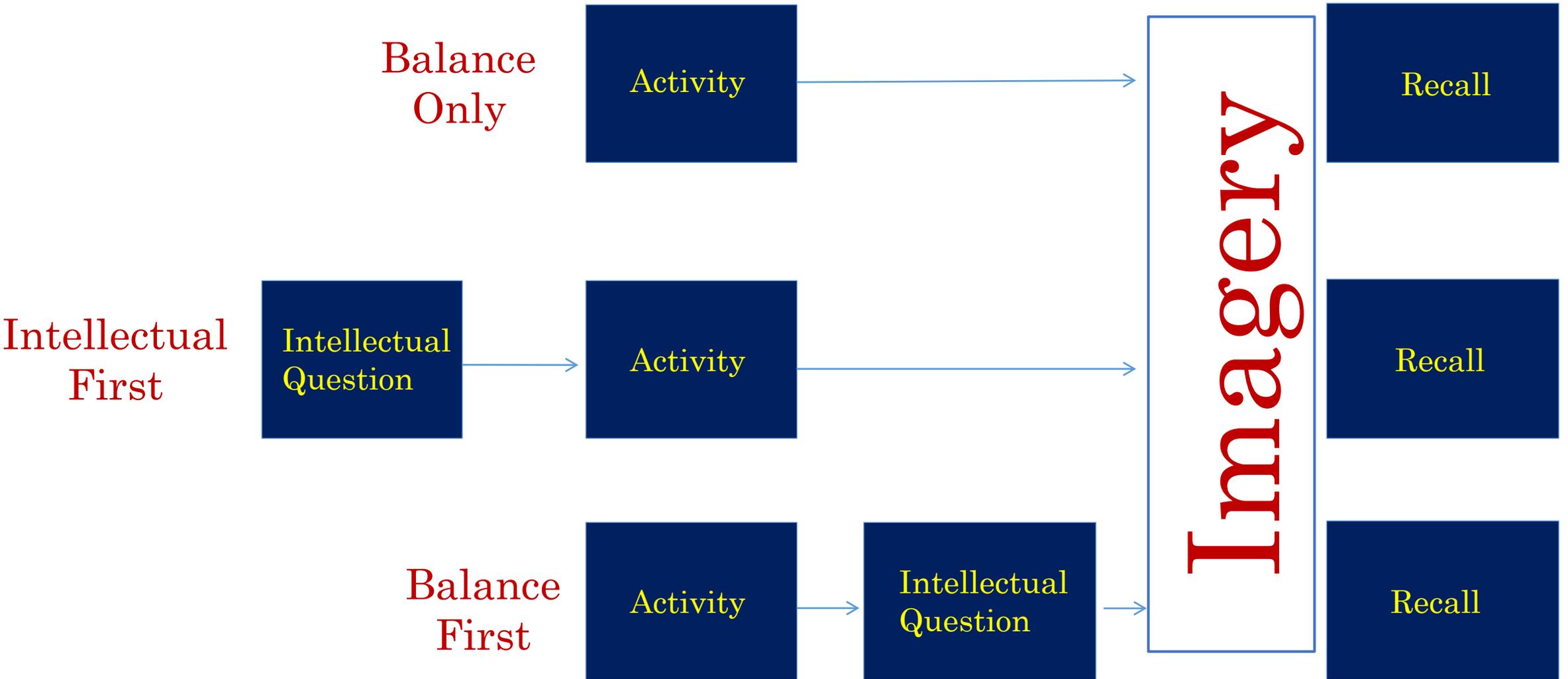
Subjects: 114 physics-naïve participants from the ed psych pool

Results

Accuracy at answering intellectual and recall questions

Conclusions

- What are people's preconceived notions about balancing on a balance beam?
  Answer: >80% say swing arms in opposite dir. of fall to compensate—WRONG!

- Can people correctly recall which way their arms swing to regain their balance after doing a balancing activity? Answer: At the random level, yes (~50%)

- Does asking a question that elicits intellectual knowledge **BEFORE** doing a balancing activity affect individuals' ability to correctly recall which way their arms swing to regain their balance? Answer: Not really

- Does asking a question that elicits intellectual knowledge **AFTER** doing a balancing activity, but **BEFORE** recall affect individuals' ability to correctly recall which way their arms swing to regain their balance?
  Answer: Yes, somewhat **adversely** affects their ability to recall **without imagery**. but **no effect with imagery**.

Conclusions

- Does imagery help accuracy of recall? Overall, No. But those in imagery activity who swing their arms correctly are much more likely to recall correctly.

Take away messages:

People have very strong preconceived notion of what one does to regain balance and it is very wrong (10-20% correct)! Performing a balancing activity helps to bring correct recall up "considerably" to random (50% correct).

It is hard to get people to engage in imagery without resorting to intellectual knowledge.