

# Taking in both Global and Local Levels Increases Insight Problem-Solving



Tiffani Ng & Mark Beeman  
Northwestern University

## Introduction

Visual attention tasks → attention state → problem solving processes:

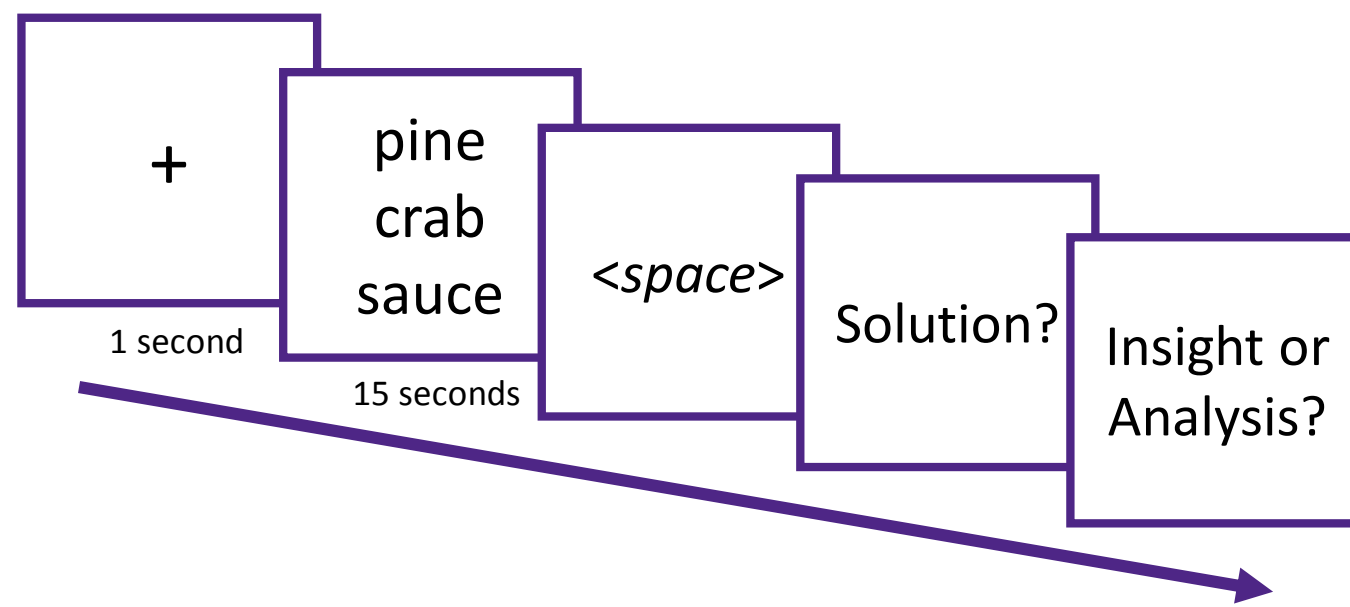
- “Narrow” attention → analytic solving
- “Broader” attention → insight solving

But is “global” attention actually selective attention at a bigger picture?

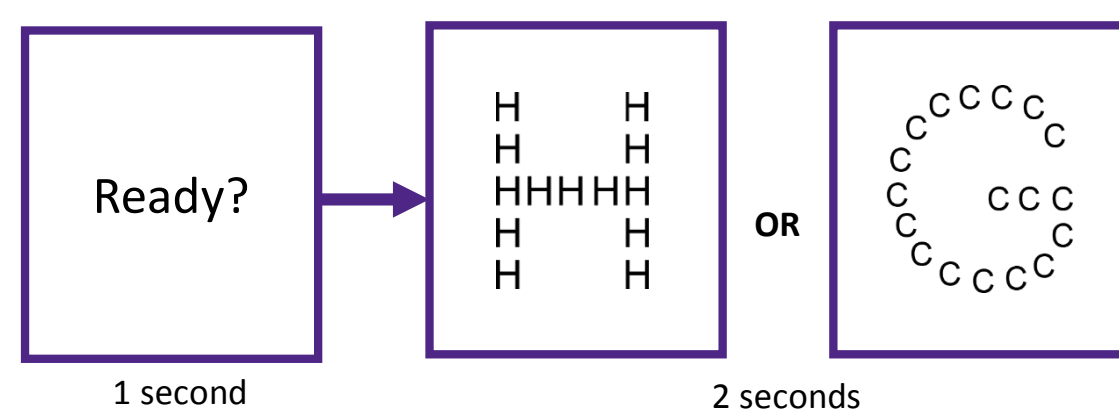
And is it broad attention that leads to insight or “leaky” attention?

## Methods

1. Compound Remote Associates (CRA) problems (set A)



2. Judgments about hierarchical letters (Attention task)



Conditions and prompts (IVs):

**Local** = Is the SMALL letter either an H or S? (Yes/No)

**Global** = Is the BIG letter either an H or S? (Yes/No)

**Match** = Do the big and small letter match? (Yes/No)

3. CRA problems (set B)

DV = Change in insight and analytic solving

(Subjects who didn't use insight/analytic rating and performed under 90% on the attention task were excluded from further analysis)

## References

Ansburg, P. I., & Hill, K. (2003). Creative and analytic thinkers differ in their use of attentional resources. *Personality and Individual Differences*, 34(7), 1141-1152.  
Wegbreit, E., Suzuki, S., Grabowecy, M., Kounios, J., & Beeman, M. (2012). Visual attention modulates insight versus analytic solving of verbal problems. *The journal of problem solving*, 4(2), 94.

## Hypotheses

**Local:** Induces narrow attention → increase in analytic solving

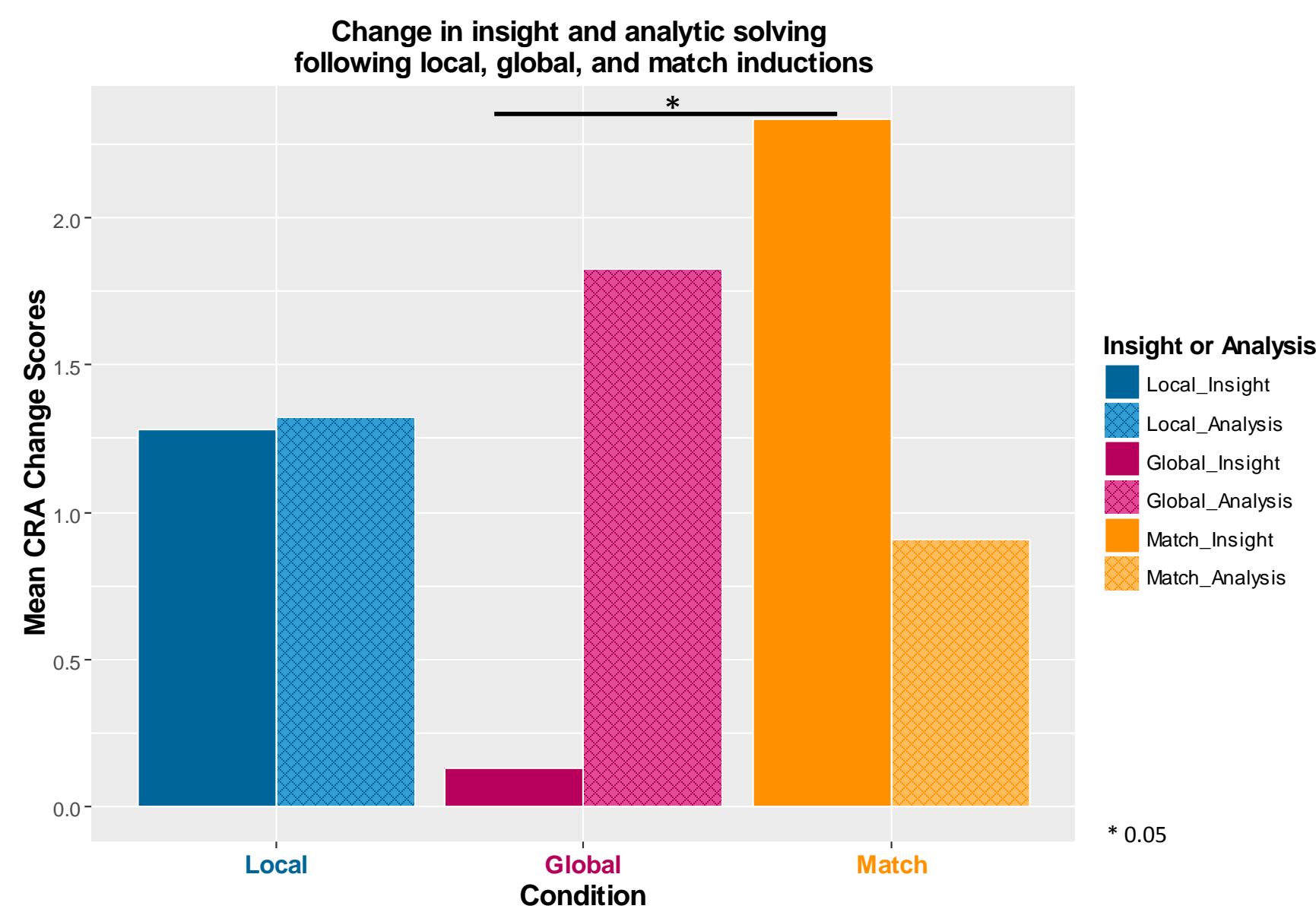
**Global:**

- If induces “broad” attention → increase in insight solving
- If requires selective attention, just at a broad spatial level → increase in analytic solving

**Match:**

- If induces spreading of attention across both levels → increase in insight solving
- If induces switching between both levels → Increase in insight (switching flexibility)? Or in analytic (rapid, but selective)?

## Experiment 1

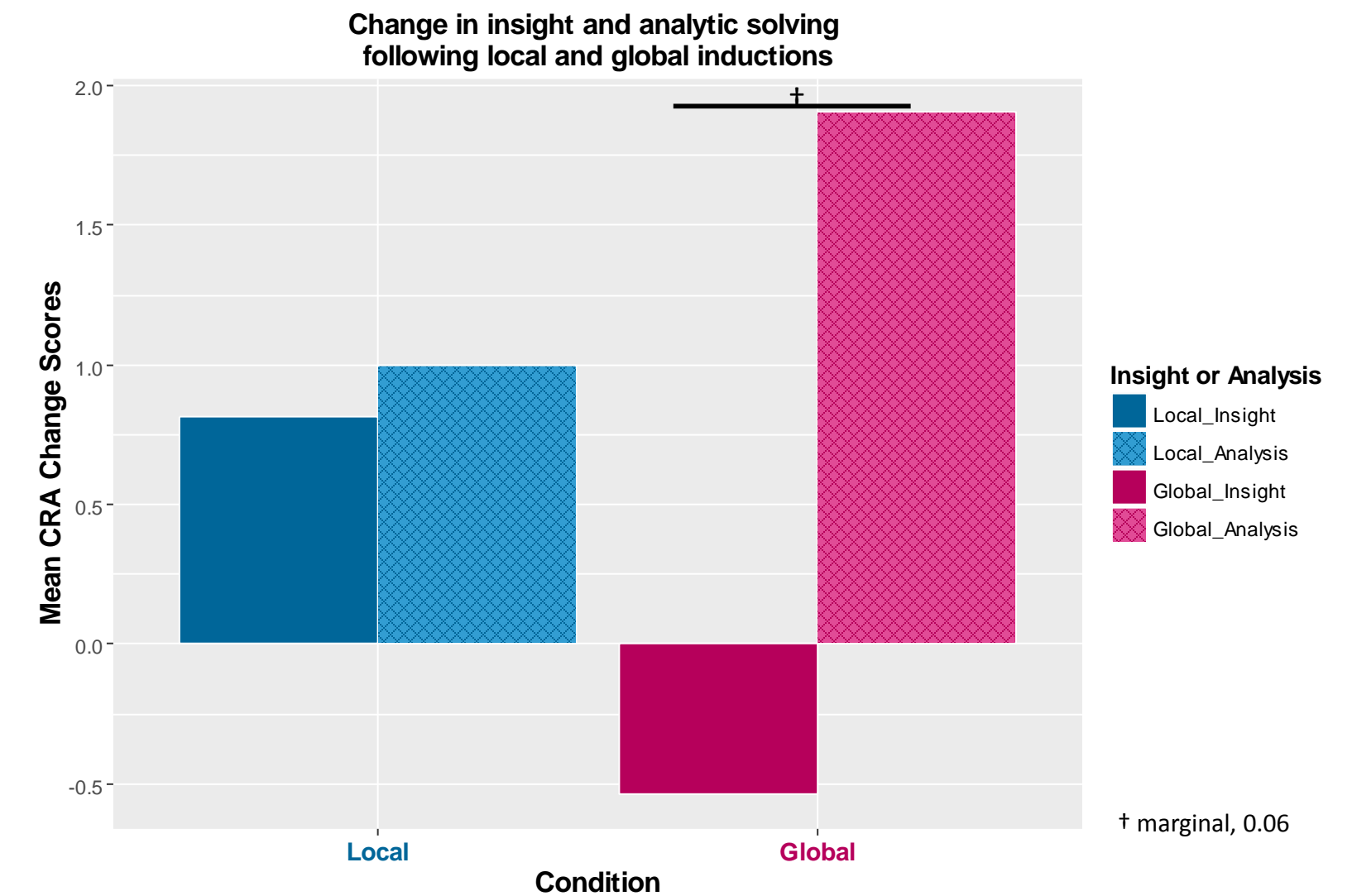


- **Local** (N=25): Solved marginally more problems *by insight* ( $p=.06$ ) and *analytically* ( $p=.10$ ) after local task than before
- **Global** (N=23): Solved reliably more problems *analytically* ( $p=.03$ ) after global task than before; *no change in insight*
- **Match** (N = 21): Solved reliably more problems *by insight* ( $p<.01$ ) after match task than before; *no change in analysis*
- **Match** group solved reliably more problems *by insight* than **Global** group ( $p=.05$ )
- All groups solved reliably more problems in 2<sup>nd</sup> set
  - Order effect?

## Experiment 2

Same procedure, but:

- Counterbalanced CRA sets A and B (removed order effect)
- Re-induced Attention task during 2<sup>nd</sup> set of CRAs



- **Local** (N=28): Same pattern – equal but ns. change
- **Global** (N=27): Increased *analytic* solution replicated ( $p=.02$ ), even when accounting for order effects & reinforced visual attention. Marginally more problems overall solved analytically than by insight ( $p=.06$ ).
- **Match**: Not enough data, but doesn't appear to replicate increased insight solving from expt. 1

## Attention task results

	condition	%correct	Mean RT	%correct (re-induction)	Mean RT (re-induction)
Expt. 1	Local	97.4%	581ms		
	Global	95.9%	566ms		
	Match	95.6%	730ms		
Expt. 2	Local	94.9%	591ms	94.6%	556ms
	Global	97.1%	602ms	96.6%	549ms
	Match	96.7%	720ms	96.7%	658ms

- In Expt. 2, RT improved across blocks

## Conclusions

Why does attention to global letters increase analytic solving?

- Interference from local stimuli requires selective attention, which may help analytic processing