



# Analytic and Associative Thinking in Creative Problem Solving

## Insight Problem Solving Performance Mediates Cognitive Reflection and Creative Problem Solving

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<https://zoom.us/j/91320438136?pwd=SVhNZ1FYbC9DbIJ2aGd4bmwyN2dZUT09>

### SUMMARY

Dual process model posits that both **Type 1 processing (T1)** and the **Type 2 processing (T2)** are involved in the **creative thinking process**.

I tested the claim that both the Insight Problem Solving (IPS) performance as a measure of T1 and Cognitive Reflection Test (CRT-7) for T2 will predict the **Cognitive Problem Solving (CPS) performance**.

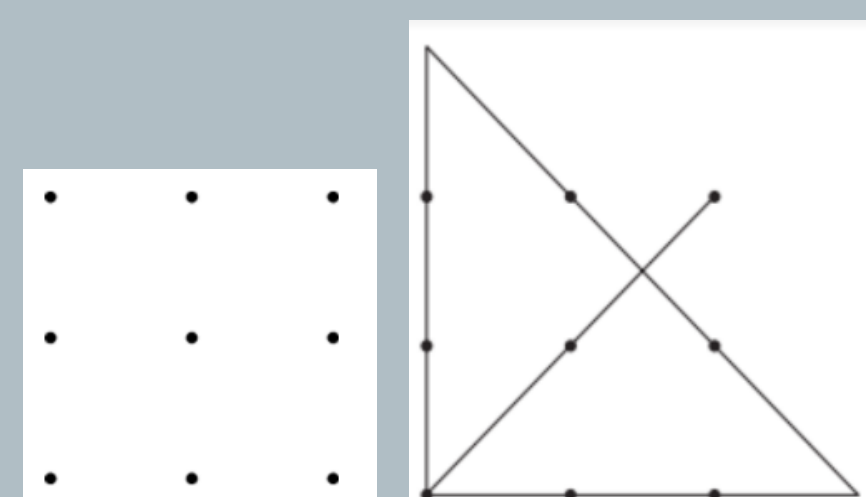
I used business process in the study as the specific domain area of the problem. Three judges rated the responses of 117 student respondents. The inter-rater reliability ranged from good to excellent (.75 to .91). I tested the predictors to determine mediation effect of Cognitive Reflection between IPS performance and CPS.

**CPS is indirectly predicted by IPS through Cognitive Reflection.** The mediation effect follows the account that T1 and T2 processing are integrated in the creative thinking where the T2 is necessary to create associations.

### METHODS

**Insight Problem Solving Tasks** (Danek, Wiley, & Öllinger, 2016)  
9-dot problem; 8-coin problem; Matchstick arithmetic problem

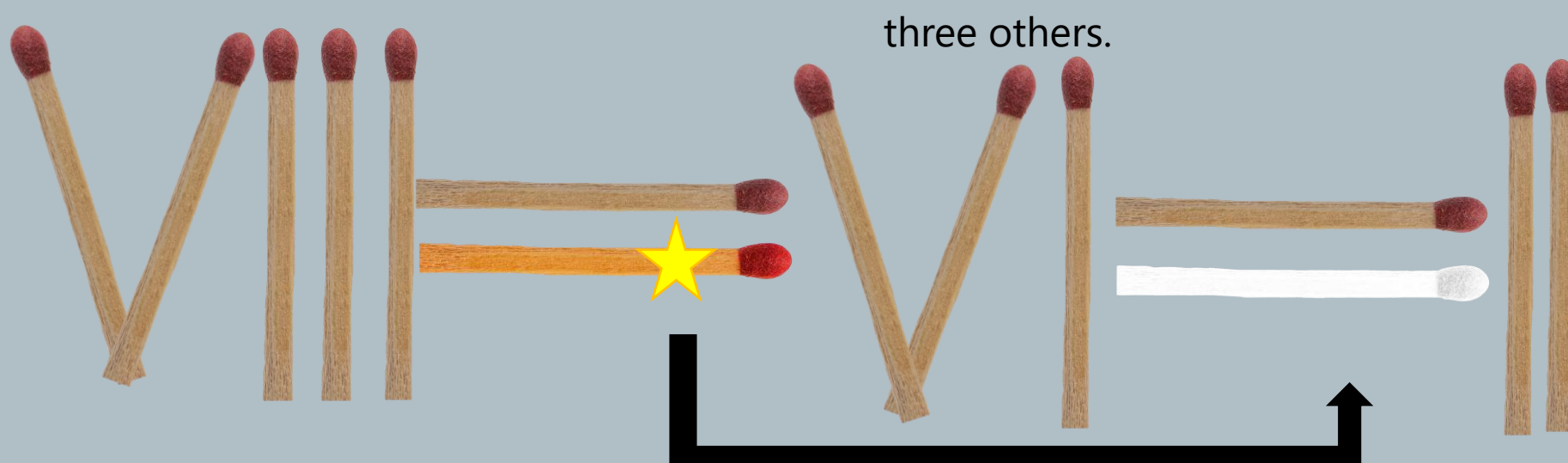
#### Insight Problems



Draw four straight lines which go through all of the dots without taking the pencil off the paper.



Your task is to alter this arrangement by moving two coins so that each coin touches exactly three others.



Transform the arithmetic statement into a correct one by moving only one single matchstick.

**Cognitive Reflection Test (CRT-7)** (Toplak, West, & Keith, 2013)

Jerry received both the 15th highest and the 15th lowest mark in the class. How many students are in the class? \_\_\_\_\_ students.

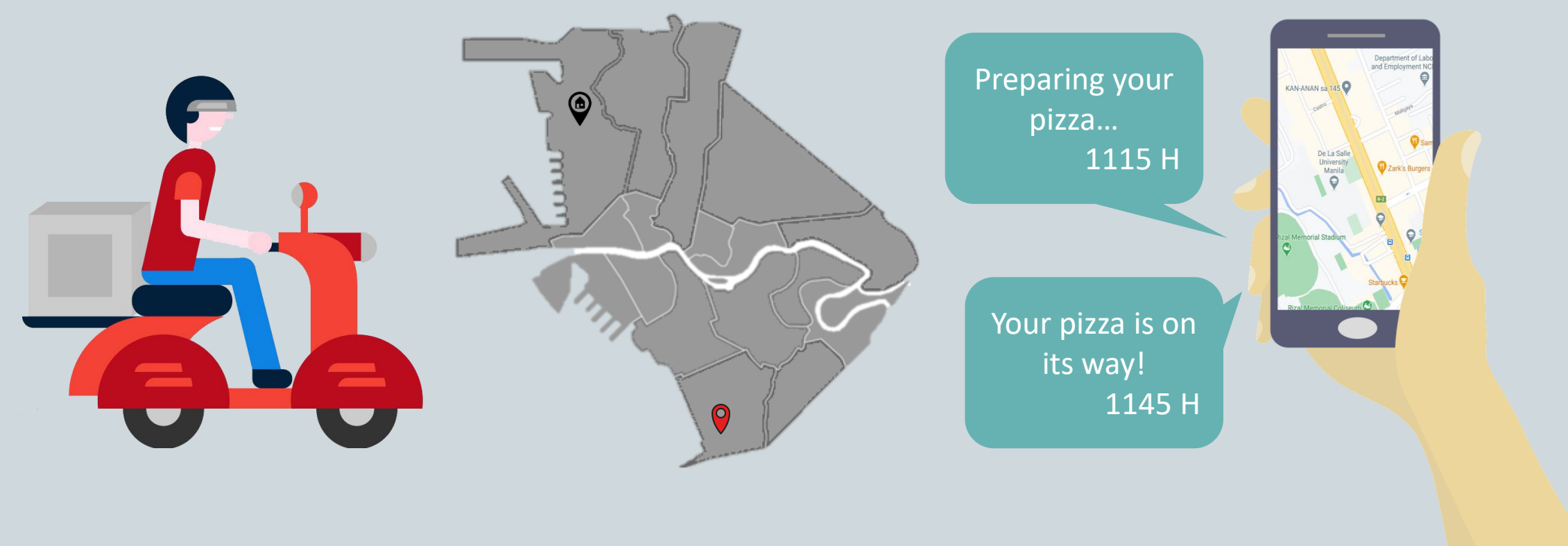
### METHODS (cont'd)

**Process Innovation Task** (Dean, Hender, Rodgers, and Santanen, 2006)

... Your task as a consultant is to generate ideas on how to improve the process of the pizza delivery service from several points of view. ...

The pizza-delivery service wants to improve its processes so customers know at all times when their pizzas will arrive. How can the process be changed to implement this improvement? Write down as many options as you can think of.

Sample: undergraduate students (n = 117)



**Sample response relatively LOWER creative problem solving:**

"Clerk rights note while taking order. Clerk will just add more notes for additional orders. Chef will get to start preparing pizza earlier period always have delivery boy ready."

**Sample response relatively HIGHER creative problem solving:**

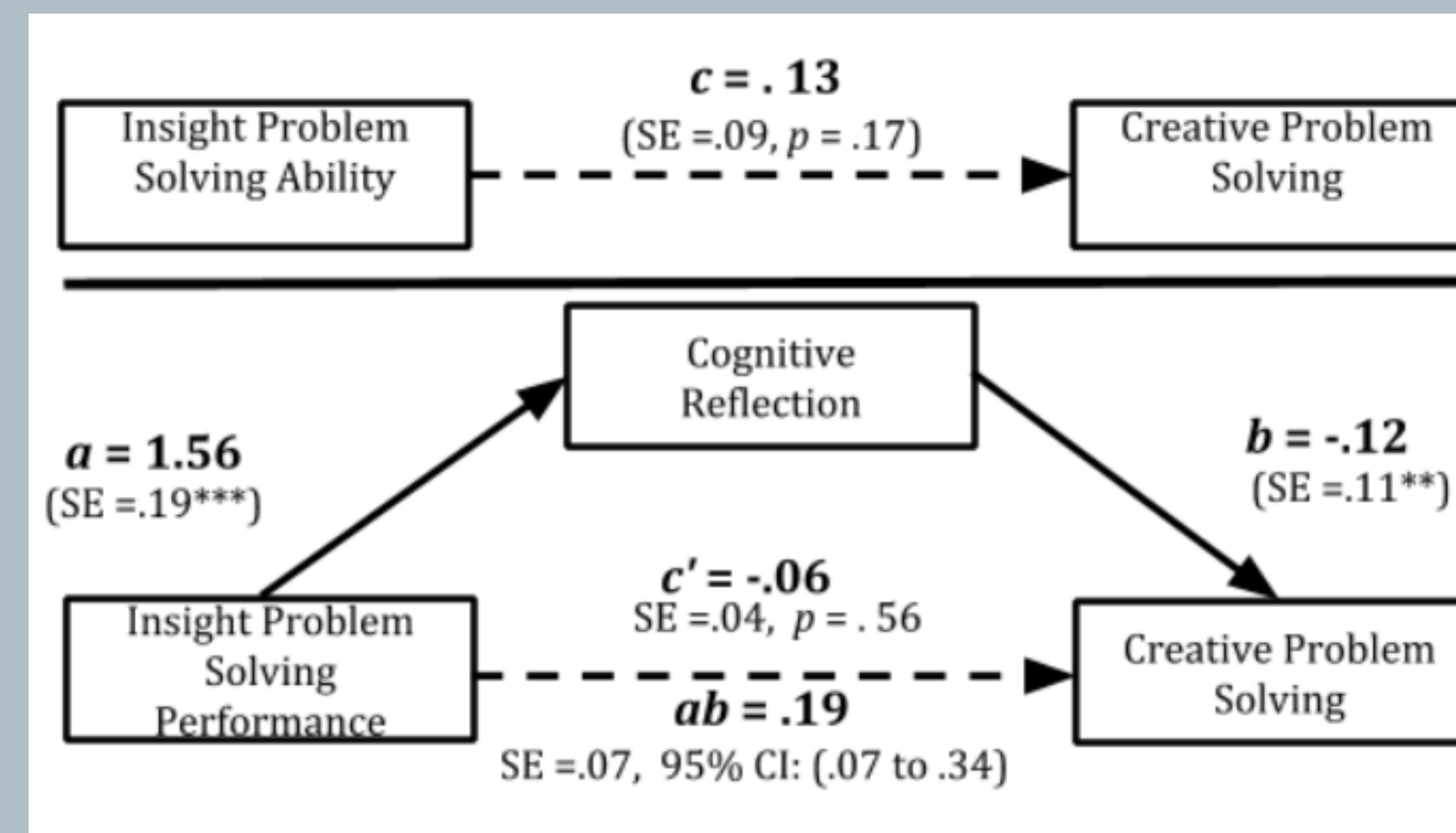
"Mobile app to track the delivery. Real time online delivery website, shows the stages of processing your food example currently preparing, packing, on delivery etc. Provide update of the order to SMS text message. Order management system."



Judge 1 Judge 2 Judge 3

interrater-reliability ICC: .91  
mean-rating (k = 3) consistency, 2-way random-effects model

### RESULTS



Mediation analysis

- Together, IPS and CRT explain the 8.2% of the variance of the Creative Problem Solving performance score,  $F(2, 114) = 5.09, p = .008$
- IPS did not directly predict CPS but indirectly instead through cognitive reflection
- mediation effect is significant ( $Z = -2.82, p = .005$ )

### CONCLUSION

- both the **problem restructuring** as measured in insight problem solving and cognitive reflection have contribution to creative problem solving
- in line with the notion that **T2** is the essential component for the problem solver **to explicitly process the creative thoughts** into consciousness

### LIMITATIONS

- Did not control for general cognitive ability

### REFERENCES

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