

Diversity of inference strategies can enhance the wisdom-of-crowds effect

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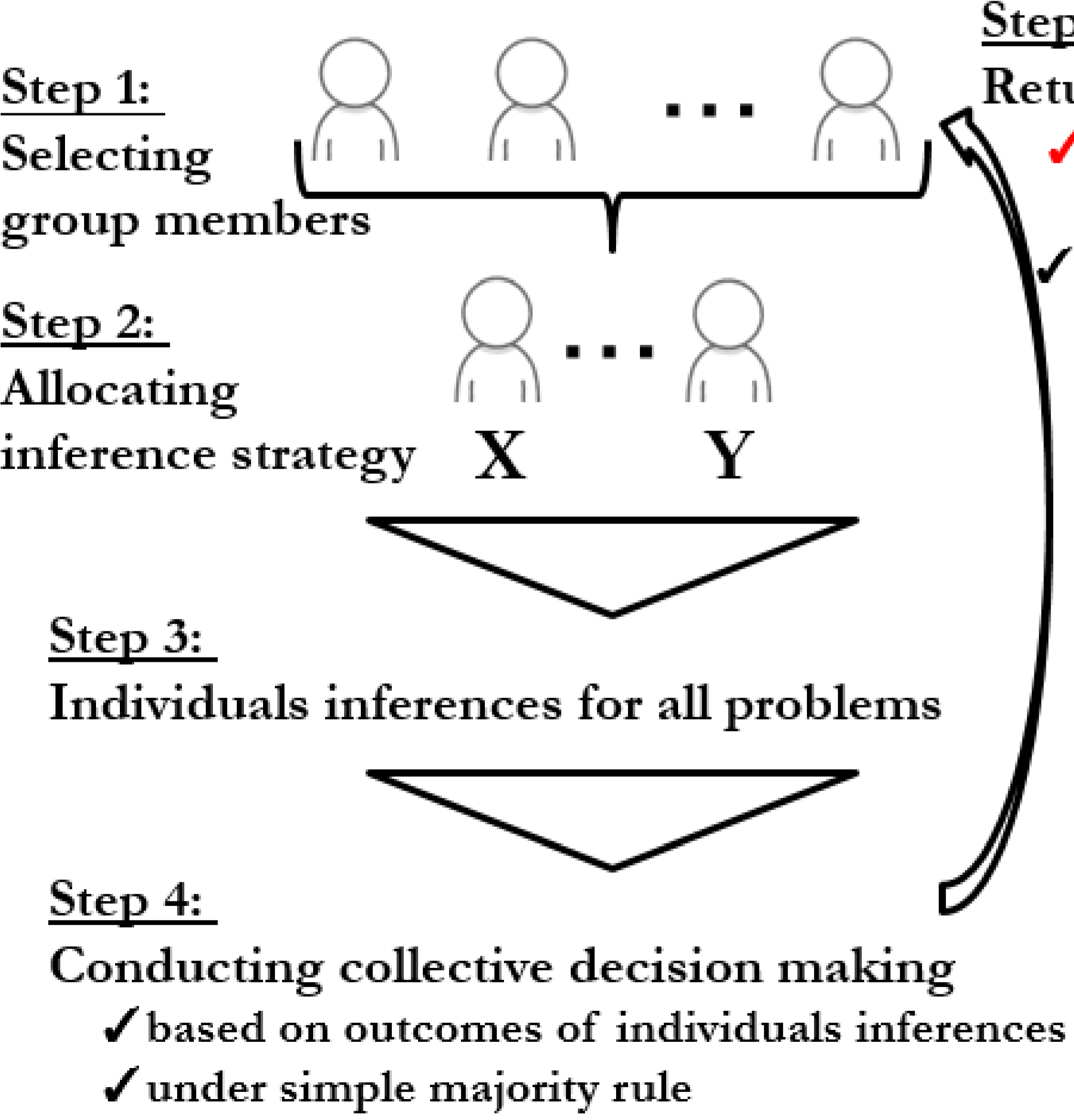


1. Introduction

- Researches on inference have shown that people use diverse inference strategies depending on the situation (e.g., Kahneman & Frederick, 2005).
 - e.g.) heuristics & knowledge-based inference
- However, it remains unclear how the strategies people use affect group performance.
- In this respect, studies on the **wisdom-of-crowds** ('WoC') effect have shown that **diversity** can be a critical factor of group performance (e.g., Hong & Page, 2004).
- Therefore, **we hypothesized that the diversity of inference strategies among group members can enhance WoC effect** and conducted 2 simulation studies.

2. Simulation studies

Procedure



	Materials	
	Study 1	Study 2
Data	Behavioral data (Honda et al. 2017)	Created environmental settings
Strategy	*FA & SK	A & B
Task	Binary choice tasks	
Number of problems	105 × 2 (Easy/Difficult)	100
Number of people	108	100

FA: Familiarity Heuristic (e.g., Honda et al., 2011)
 SK: Subjective knowledge-based inference (e.g., Oppenheimer, 2003)
 ➤ Well-explaining people's inferences (Honda et al., 2017)

3. Results

Study 1

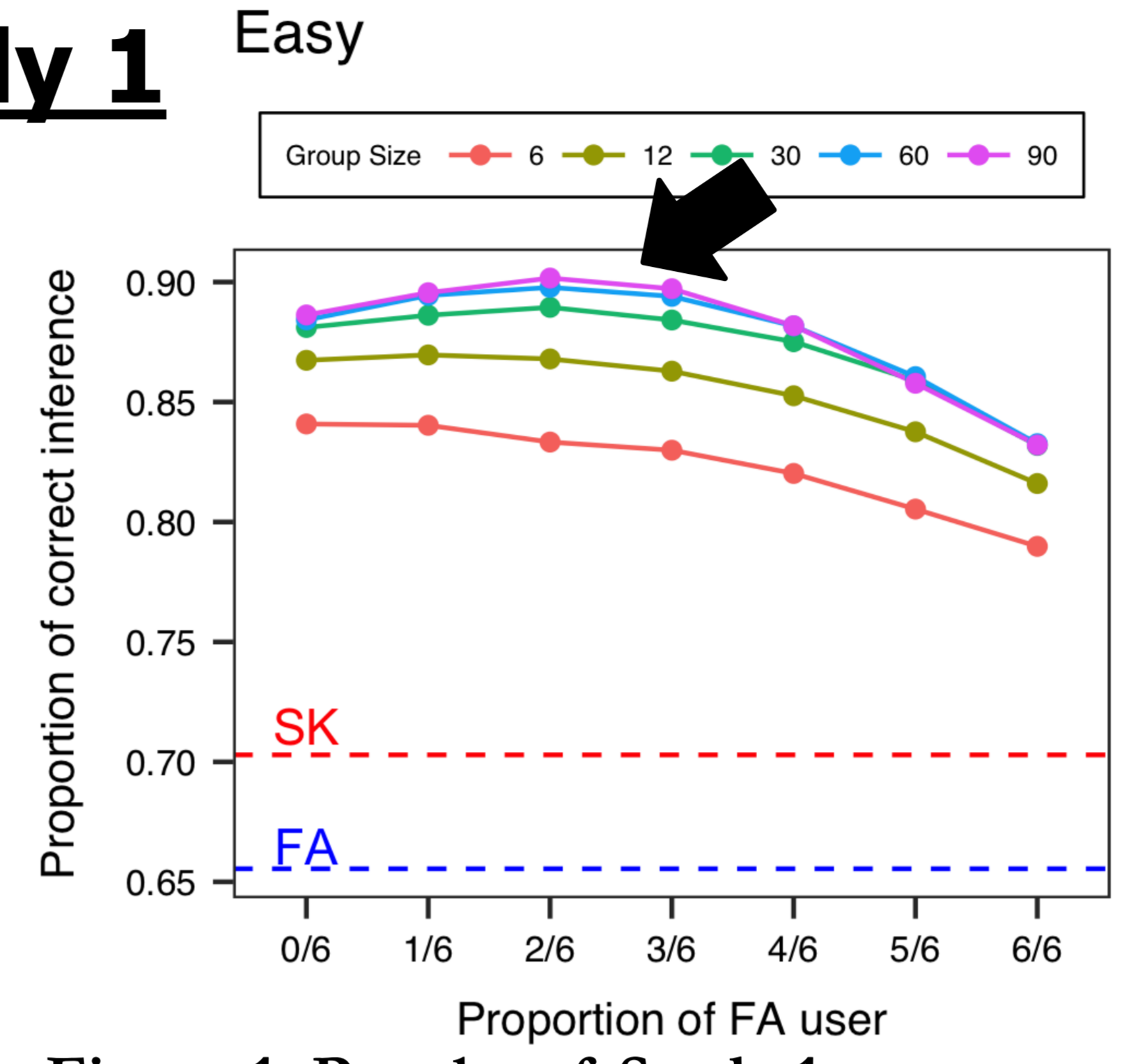


Figure 1. Results of Study 1 (in the Easy list).

➤ The diversity of strategies could enhance WoC effect.

- Because the **bias** in a single strategy was partly cancelled out by the other strategy.
 - Bias: the accuracy by an individual is below 0.5.

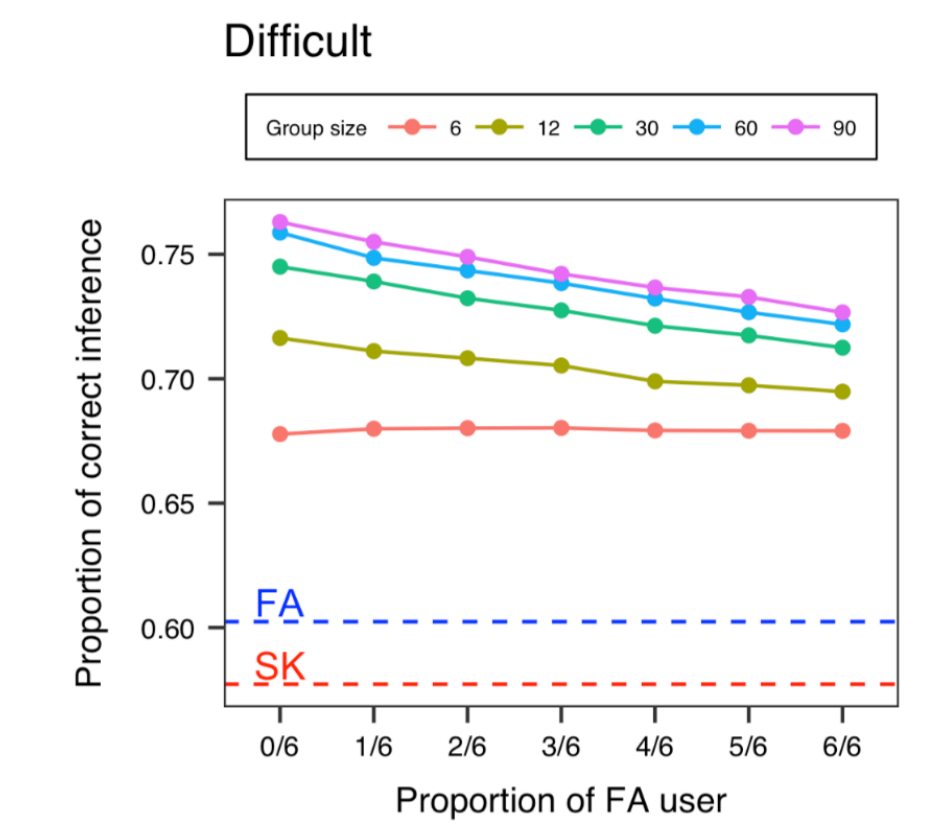


Figure 2. Results of Study 1 (in the Difficult list).

Study 2

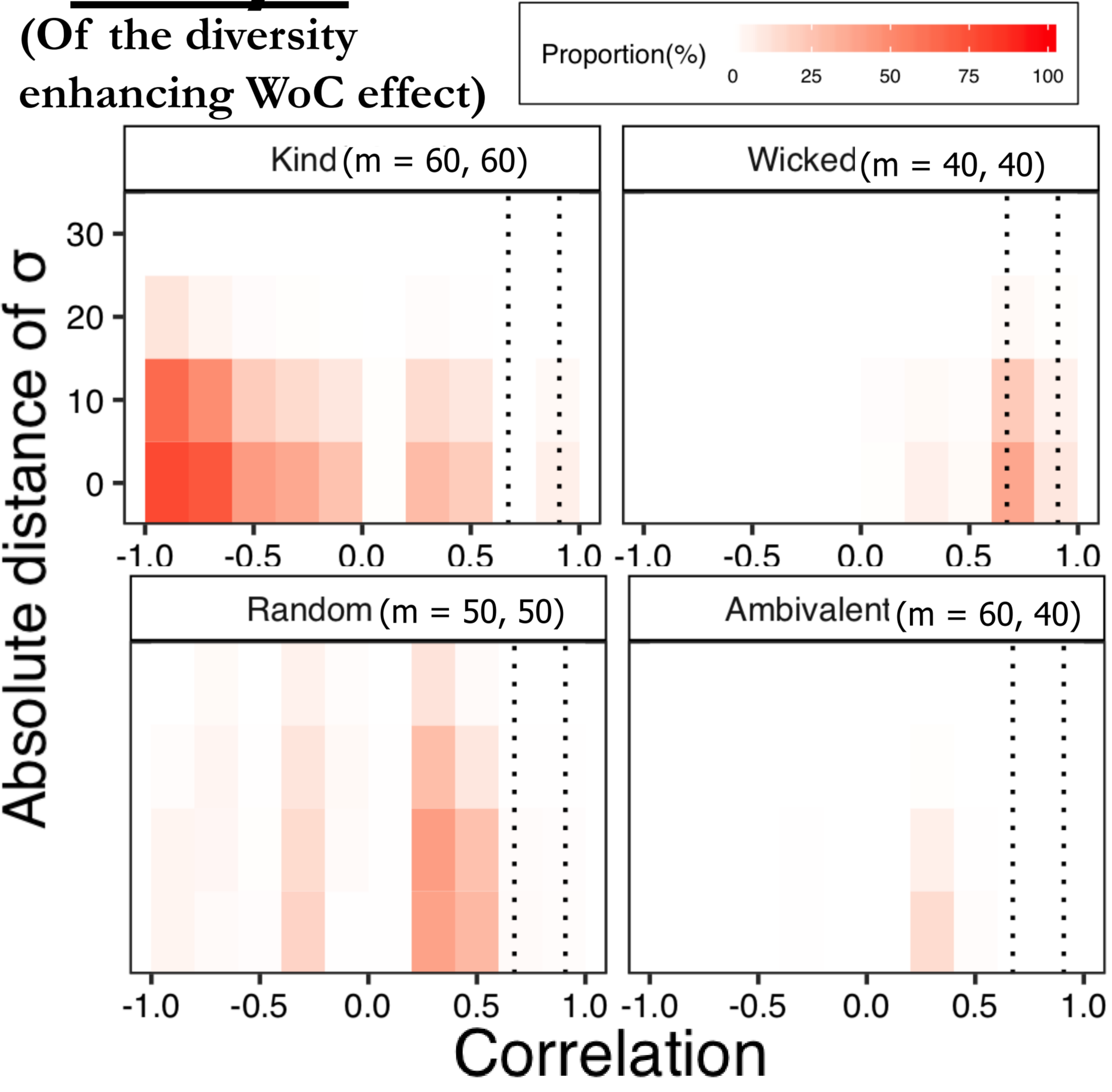


Figure 2. Results of Study 2. group size = 100

Environments

- Creating four environments.
 - Kind, Wicked, Random, and Ambivalent
 - The accuracy of the two strategies by an individual ('m') differed among them.
- Manipulating two factors through the simulations.
 - The variance of m on a strategy ('σ')
 - The correlation of m between two strategies ('cor')

➤ The findings in Study 1 were generalized: the diversity of strategies could enhance WoC effect in all four environments.

- Moreover, we clarified its condition on each environment.
 - concerning σ and cor.

4. General Discussion

- ✓ To the best of our knowledge, this was the first study which focused on **the diversity of inference strategies** and showed that it could enhance WoC effect.
 - Previous studies: the diversity of estimated values (e.g., Lorenz et al., 2011), searched cues (Luan et al., 2012), etc.
- ✓ Moreover, **we believe this study also contributes to inference research.**
 - Since it indicates an investigation at the group level can offer insights into the nature of human inference.