Sous-détermination, incomplétude, incommensurabilité : la pensée des limites

Reasoning, argumentation, and science

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Intuitive inferences (intuition)

It's going to rain

It needs food and water

Peter is 8, John is 12 → John is older than Peter

Two types of inferences

Reflective inferences (reasoning)

The pressure and the temperature are dropping ➡️ It's going to rain

 These are purple sulfur bacteria ➡️ They need hydrogen sulfide

$S=1+2+...+99+100$ ➡️ $S=(100*101)/2$

The classical view of reasoning

The Levesque task

Peter is looking at Linda

Linda is looking at Henry

Peter is married

Henry is not married

Is someone who is married looking at someone who is not married?

Yes   No   We can't tell

An intuitive mistake

Peter is looking at Linda

Linda is looking at Henry

Peter is married

Henry is not married

Is someone who is married looking at someone who is not married?

Yes   No   We can't tell

Reasoning saves the day

Peter is looking at Linda

Linda is looking at Henry

Peter is married

Henry is not married

Is someone who is married looking at someone who is not married?

Yes   No   We can't tell

Reasoning can help the lone reasoner correct mistaken intuitions and arrive at better beliefs

The Levesque task

Peter is looking at Linda

Linda is looking at Henry

Peter is married

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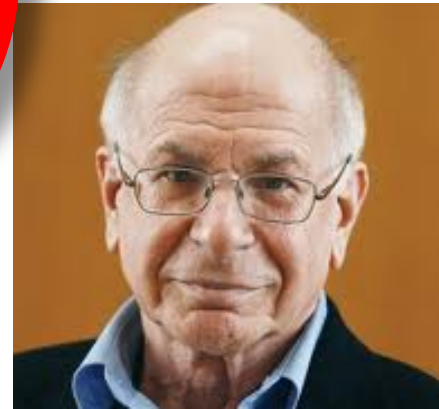Is someone who is married looking at someone who is not married?

Yes   No   We can't tell

Reasoning *can* help the lone reasoner correct mistaken intuitions and arrive at better beliefs

But it often doesn't

What reasoning actually does

Peter is looking

Linda is looking

Peter is married

He

is

married looking

Yes   No   We can't tell

The answer depends on Linda's status

We don't know if Linda is married

We don't have enough information

Reasoning can help the lone reasoner correct mistaken intuitions and arrive at better beliefs

But it often doesn't

Because it does precisely the opposite

WHAT THEN?

The argumentative view of reasoning

Myside bias

Selective laziness

Making the best of feedback

Sylvia: "We should go to Isami, it's a good restaurant"

Helen: "I don't know, I've had Japanese last week already"

Sylvia: "But this one is very original"

Making the best of feedback

Sylvia: "We should go to Isami, it's a good restaurant"

Helen: "I don't know, I don't have much money at the moment, and Japanese restaurants can be pricy"

Sylvia: "But this one is quite cheap"

Other option: exhaustive argument

Sylvia: "We should go to Isami, it's original, the prices are good, the fish is fresh, the crowd is lively... "

Other option: anticipation

Sylvia, thinking: I wonder if Helen has been to a Japanese restaurant lately. And would she be bothered by high prices? Does she eat raw fish? Does she enjoy the kind of crowd you get in typical Japanese restaurants? Would she believe it's in an inconvenient location?…

Prediction in production

People should typically start with a reasonable but weak, generic argument

Prediction in evaluation

People should carefully examine other people's arguments

First phase

In a fruit and vegetable shop which carries, among other products, apples:

None of the apples are organic.

What can you conclude for sure about whether fruits are organic in this shop ?

All the fruits are organic

None of the fruits are organic

Some fruits are organic

Some fruits are not organic

We cannot tell anything for sure about whether fruits are organic in this shop

"Because none of the apples are organic, and an apple is one type of fruit, we can say that some of the fruits in the store are not organic."

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Second phase

In a fruit and vegetable shop which carries, among other products, apples:

None of the apples are organic.

What can you conclude for sure about whether fruits are organic in this shop ?

- All the fruits are organic
- None of the fruits are organic
- Some fruits are organic
- Some fruits are not organic
- We cannot tell anything for sure about whether fruits are organic in this shop

You answered

Some fruits are not organic

Someone else answered

We cannot tell anything for sure about whether fruits are organic in this shop

And the argument was:

"There is not enough information to conclude about all the fruits in this shop."

If you want you can change your mind

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We cannot tell anything for sure about whether fruits are organic in this shop

Someone else answered

Some fruits are not organic

And the argument was:

"Because none of the apples are organic, and an apple is a fruit, therefore we can say that some of the fruits in the store are not organic."

If you want you can change your mind

NOT THEIR ANSWER

THEIR ANSWER

X 1

THEIR ARGUMENT

47% do not detect the inversion

57% reject their own argument

41% reject their own 'good' argument

63% reject their own 'bad' argument

Overconfidence

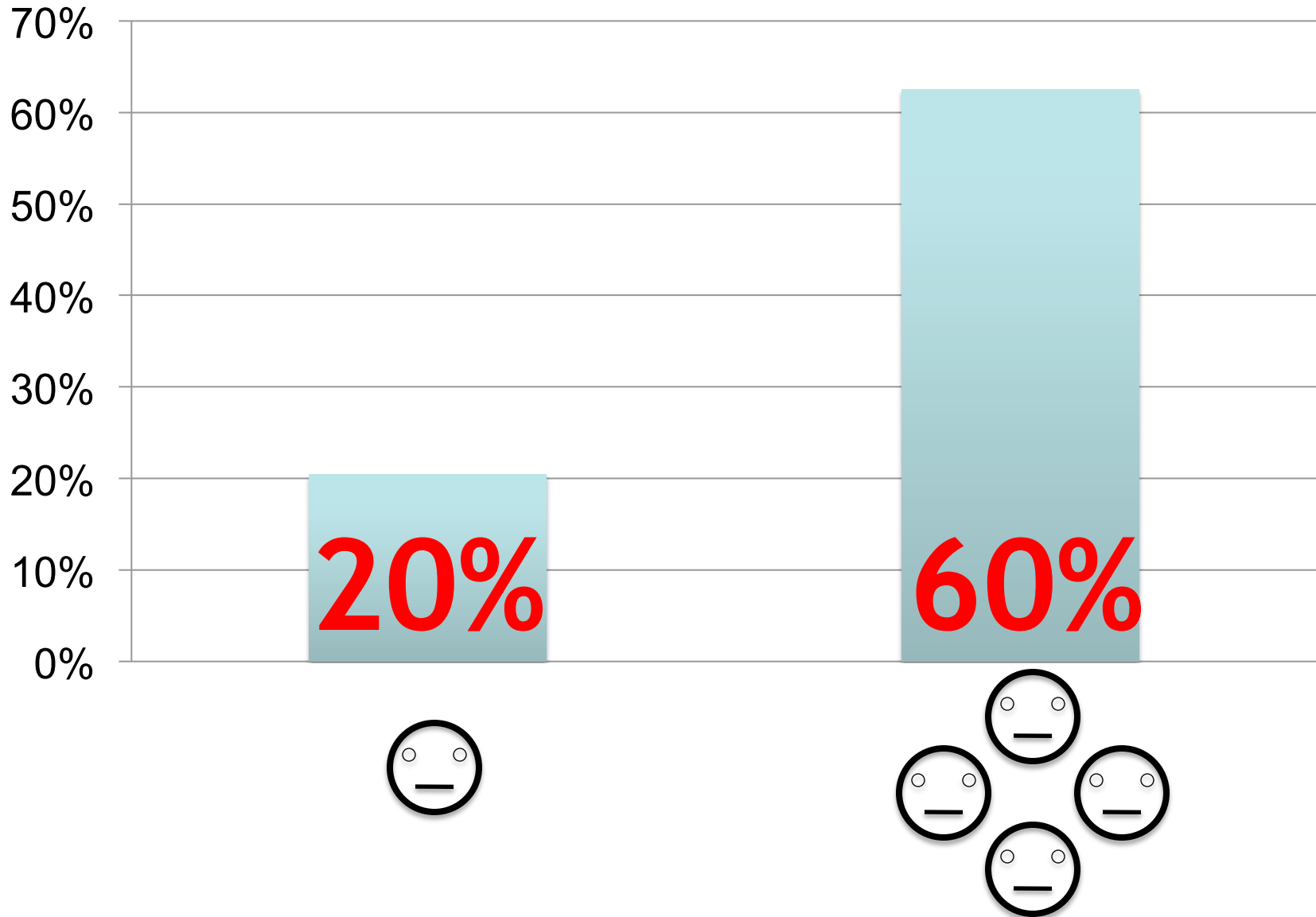# Overconfidence in individual reasoning
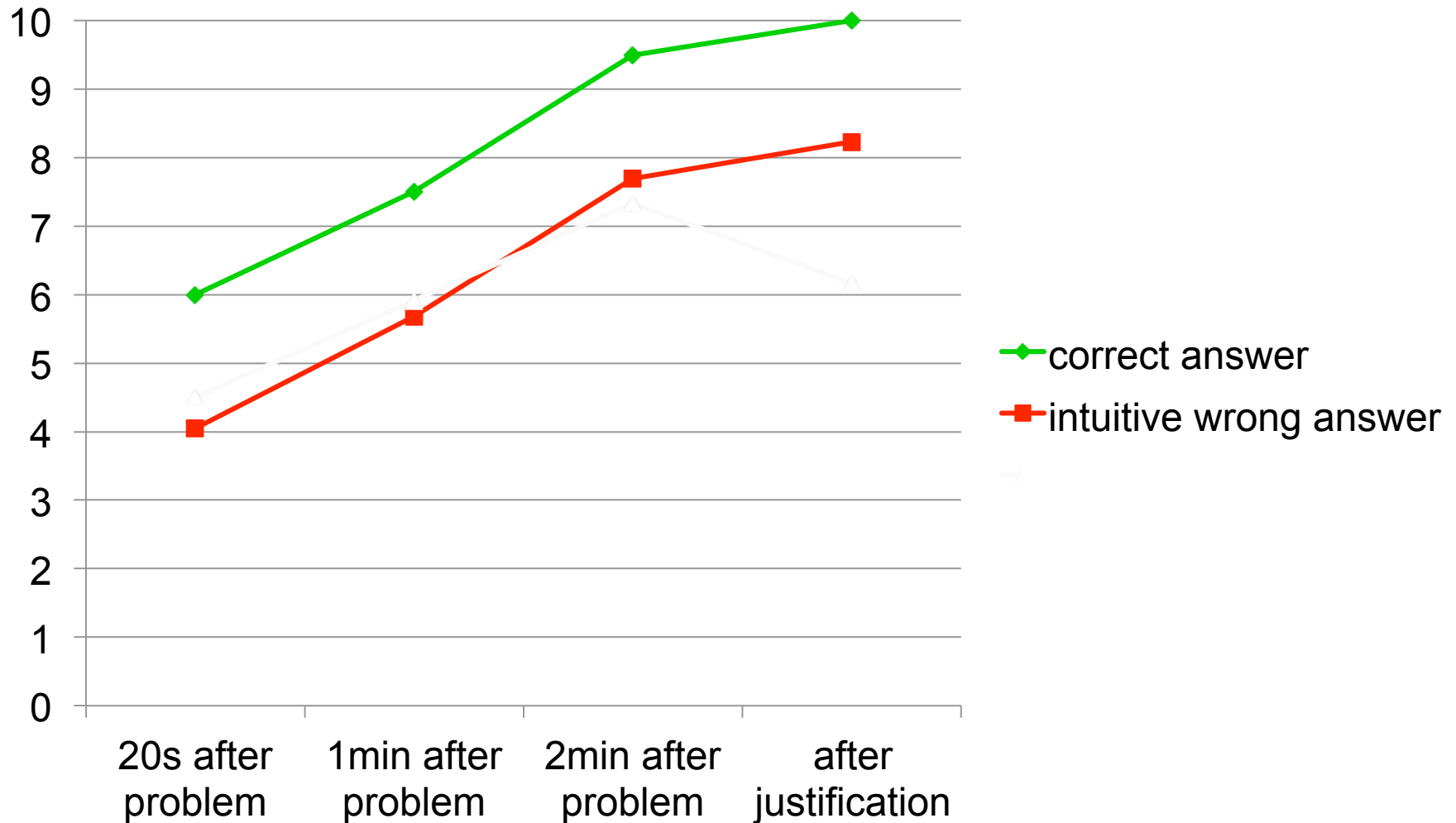
Prediction 4

Good argument evaluation skills
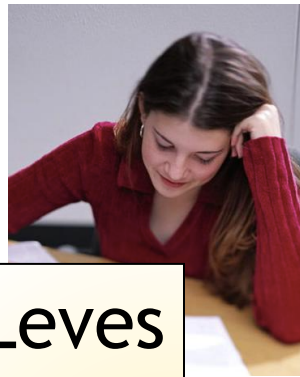
Groups outperform individuals on reasoning tasks
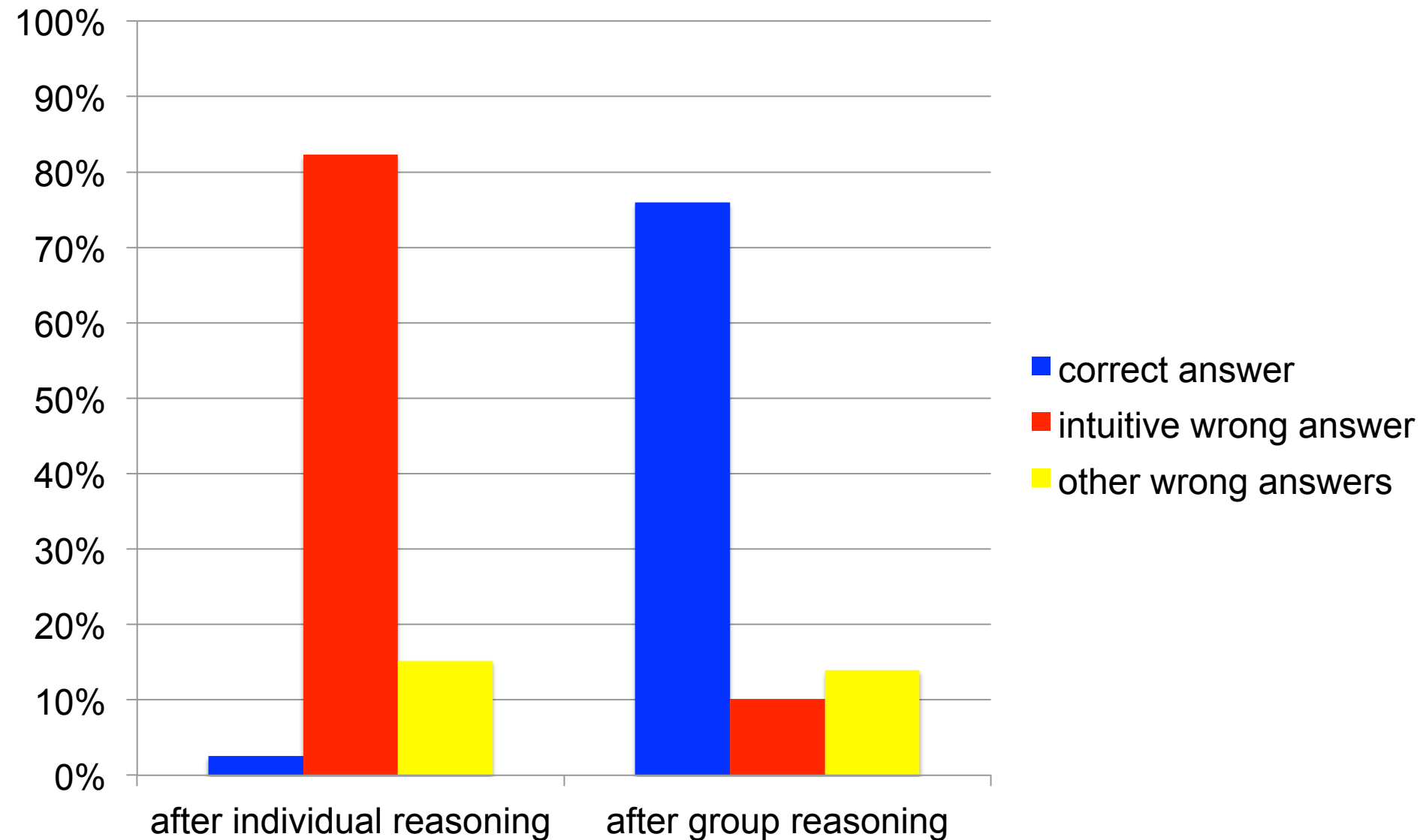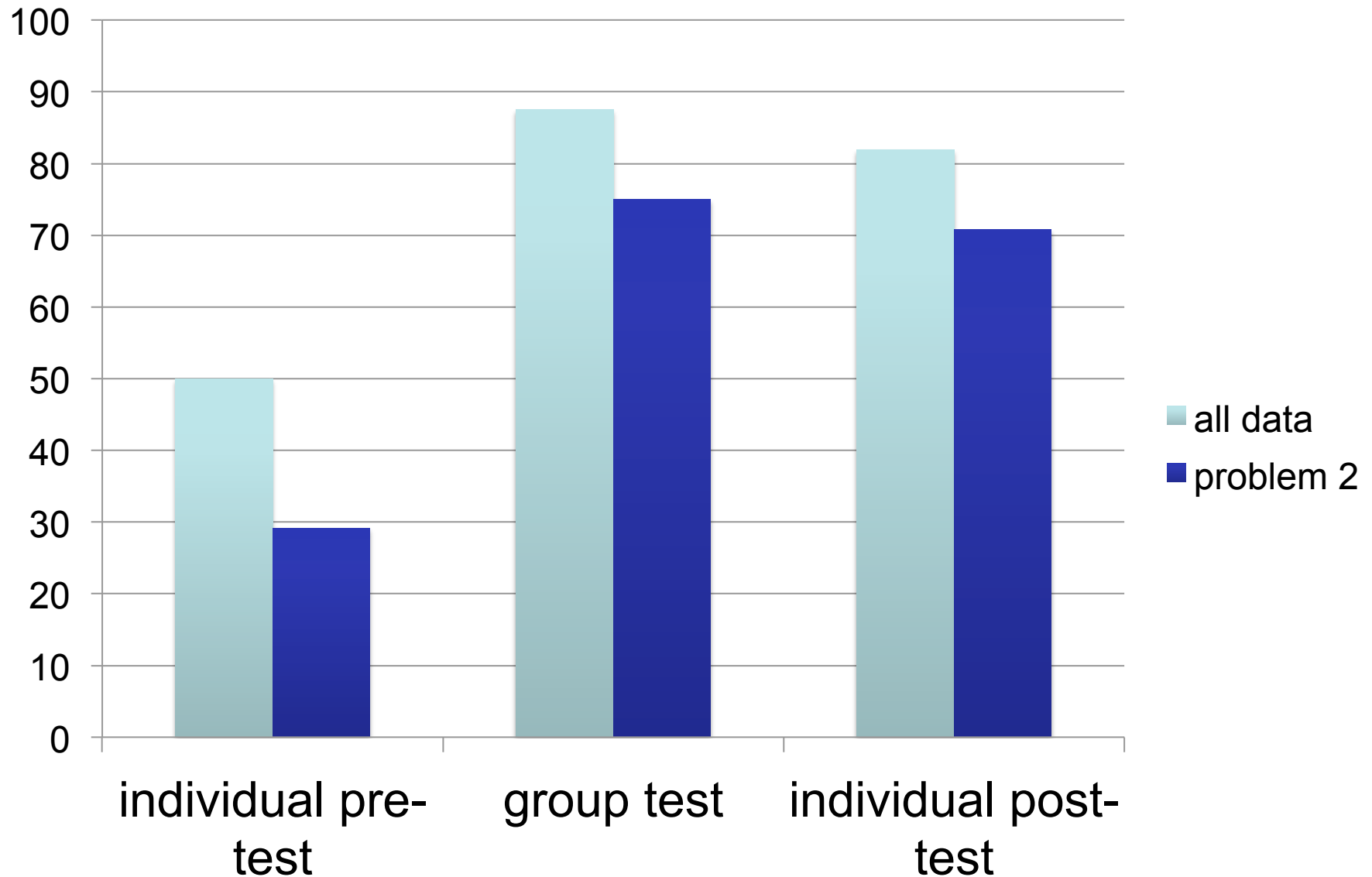
Individual vs. group

Diffusion in large groups (N=40)

% correct answers (conservation task)

Summary

Individual reasoning often achieves poor epistemic outcomes

People can evaluate others' arguments and be convinced by strong arguments

As a result, groups outperform individuals in reasoning tasks

Thank you!