

Argument mining workshop, 2019

# Argumentation and human reason

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HUGO MERCIER • DAN SPERBER

*The Enigma of Reason*



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What is reason?

# Intuition



It's going to rain



It needs food and water

Peter is 8, John is 12



John is older than Peter

# Reason

- $S=1+2+\dots+99+100$  is equivalent to  $S=(100*101)/2$  because...
- My coat is neither on the coat hanger nor in my dressing, so I must have forgotten it at work
- You shouldn't have any coffee, it will keep you awake

Why do we reason?

# The individualistic 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

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  
Henry is not married

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

Yes

No

We can't tell

**90% WRONG ANSWERS**

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

The answer depends on Linda's status

Peter is married  
He is

We don't know if Linda is married

We don't have enough information

is married looking to

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

*Because it does precisely the opposite*

# The individualist view of reasoning



**WHAT THEN?**

# The interactionist view of reason

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## Why do humans reason? Arguments for an argumentative theory

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**Abstract:** Reasoning is generally seen as a means to improve knowledge and make better decisions. However, much evidence shows that reasoning often leads to epistemic distortions and poor decisions. This suggests that the function of reasoning should be rethought. Our hypothesis is that the function of reasoning is argumentative. It is to devise and evaluate arguments intended to persuade. Reasoning so conceived is adaptive given the exceptional dependence of humans on communication and their vulnerability to misinformation. A wide range of evidence in the psychology of reasoning and decision making can be reinterpreted and better explained in the light of this hypothesis. Poor performance in standard reasoning tasks is explained by the lack of argumentative context. When the same problems are placed in a proper argumentative setting, people turn out to be skilled arguers. Skilled arguers, however, are not after the truth but after arguments supporting their views. This explains the notorious confirmation bias. This bias is apparent not only when people are actually arguing, but also when they are reasoning proactively from the perspective of having to defend their opinions. Reasoning so motivated can distort evaluations and attitudes and allow erroneous beliefs to persist. Proactively used reasoning also favors decisions that are easy to justify but not necessarily better. In all these instances traditionally described as failures or flaws, reasoning does exactly what can be expected of an argumentative device: Look for arguments that support a given conclusion, and, *ceteris paribus*, favor conclusions for which arguments can be found.

**Keywords:** argumentation; confirmation bias; decision making; dual process theory; evolutionary psychology; motivated reasoning; reason-based choice; reasoning

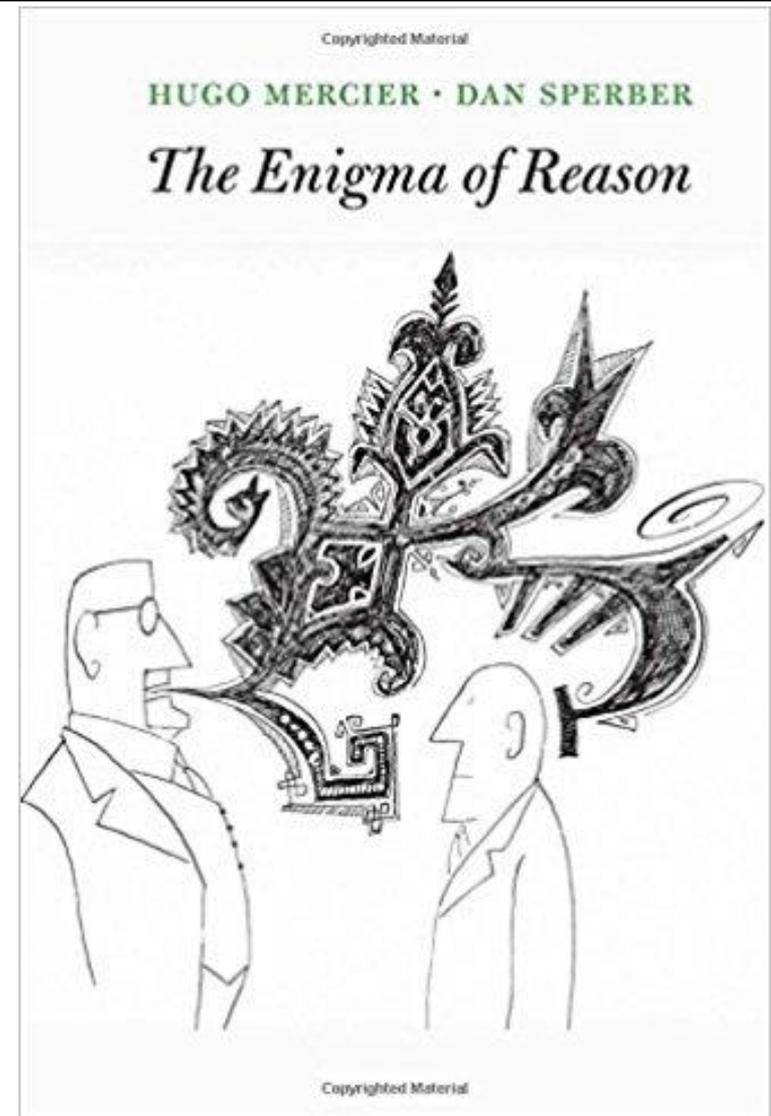
*Inference* (as the term is most commonly understood in psychology) is the production of new mental representations on the basis of previously held representations. Examples of inferences are the production of new beliefs on the basis of previous beliefs, the production of expectations on the basis of perception, or the production of plans on the basis of preferences and beliefs. So understood, inference need not be deliberate or conscious. It is at work not only in conceptual thinking but also in perception and in motor control (Kersten et al. 2004; Wolpert & Kawato 1998). It is a basic ingredient of any cognitive system. Reasoning, as commonly understood, refers to a very special form of inference at the conceptual level, where not only is a new mental representation (or conclusion) consciously produced, but the previously held representations (or premises) that warrant it are also consciously entertained. The premises are seen as providing reasons to accept the conclusion. Most work in the psychology of reasoning is about reasoning so understood. Such reasoning is typically human. There is no evidence that it occurs in nonhuman animals or in preverbal children.<sup>1</sup>

How do humans reason? Why do they reason? These two questions are mutually relevant, since the mechanisms for reasoning should be adjusted to its function. While the how-question has been systematically investigated (e.g.,

Evans et al. 1993; Johnson-Laird 2006; Oaksford & Chater 2007; Rips 1994), there is very little discussion of the why-question. How come? It may be that the function of reasoning is considered too obvious to deserve much

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DAN SPERBER is a French social and cognitive scientist. He is professor of philosophy and cognitive science at the Central European University, Budapest, and directeur de recherche émérite at the Institut Jean Nicod, (CNRS, ENS, and EHESS, Paris). He is the author of *Rethinking Symbolism* (1975), *On Anthropological Knowledge* (1985), and *Explaining Culture* (1996); the co-author with Deirdre Wilson of *Relevance: Communication and Cognition* (1986 – Second Revised Edition, 1995); the editor of *Misrepresentations: A Multidisciplinary Perspective* (2000); the co-editor with David Premack and Ann James Premack of *Causal Cognition: A Multidisciplinary Debate* (1995); and, with Ira Noveck, of *Experimental Pragmatics* (2004).



# Prediction 1

*Myside bias*

# Prediction 2

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 argument, even if it is a relatively weak, generic argument

# Prediction in evaluation

People should carefully examine other people's arguments

First phase: **NO REASONING**

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

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

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Second phase: **ARGUMENT PRODUCTION**

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**Some fruits are not organic**

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“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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“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.”

**86% stick to their intuitive answer**

Not more likely to stick to their intuitive answer if it is valid than if it is invalid

Third phase: **ARGUMENT EVALUATION**

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You answered

Some fruits are not organic

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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.”

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If you want you can change your mind

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Some fruits are not organic

And the argument was:

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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

~~NOT THEIR ANSWER~~

Someone else answered

~~THEIR ANSWER~~

And the argument was:

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

If you want you can change your mind

54% do not detect the inversion

**58% reject their own argument**

43% reject their own 'good' argument

69% reject their own 'bad' argument

# Prediction 3

Good argument evaluation skills

# Good argument evaluation skills

People discriminate between fallacious and non fallacious arguments (at least when they disagree with the conclusion)

# Good argument evaluation skills

People can accept strong enough arguments, even if the arguments challenge their beliefs

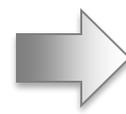
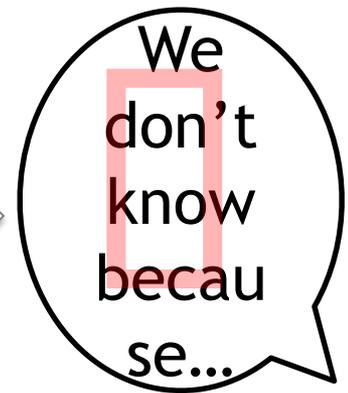
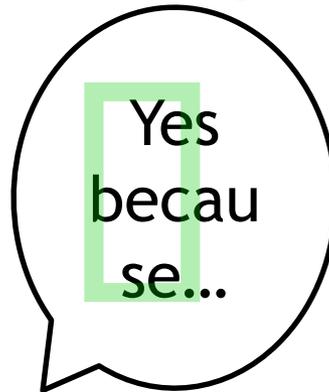
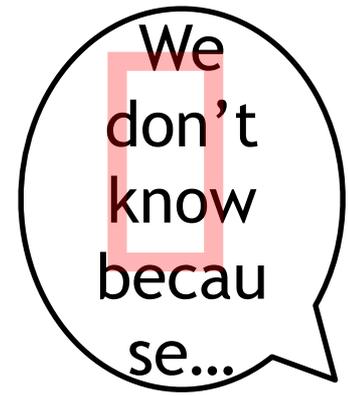
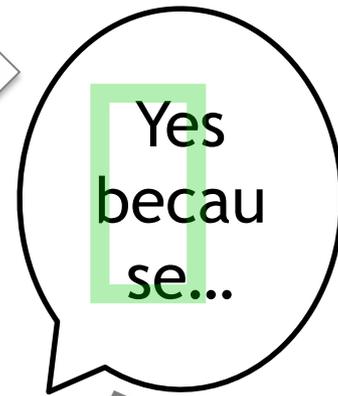
Prior confidence and trust in source do not affect the evaluation of conclusive arguments



Leve  
sque,  
etc.



Try to  
convince  
someone



Leve  
sque,  
etc.

# Confidence manipulation

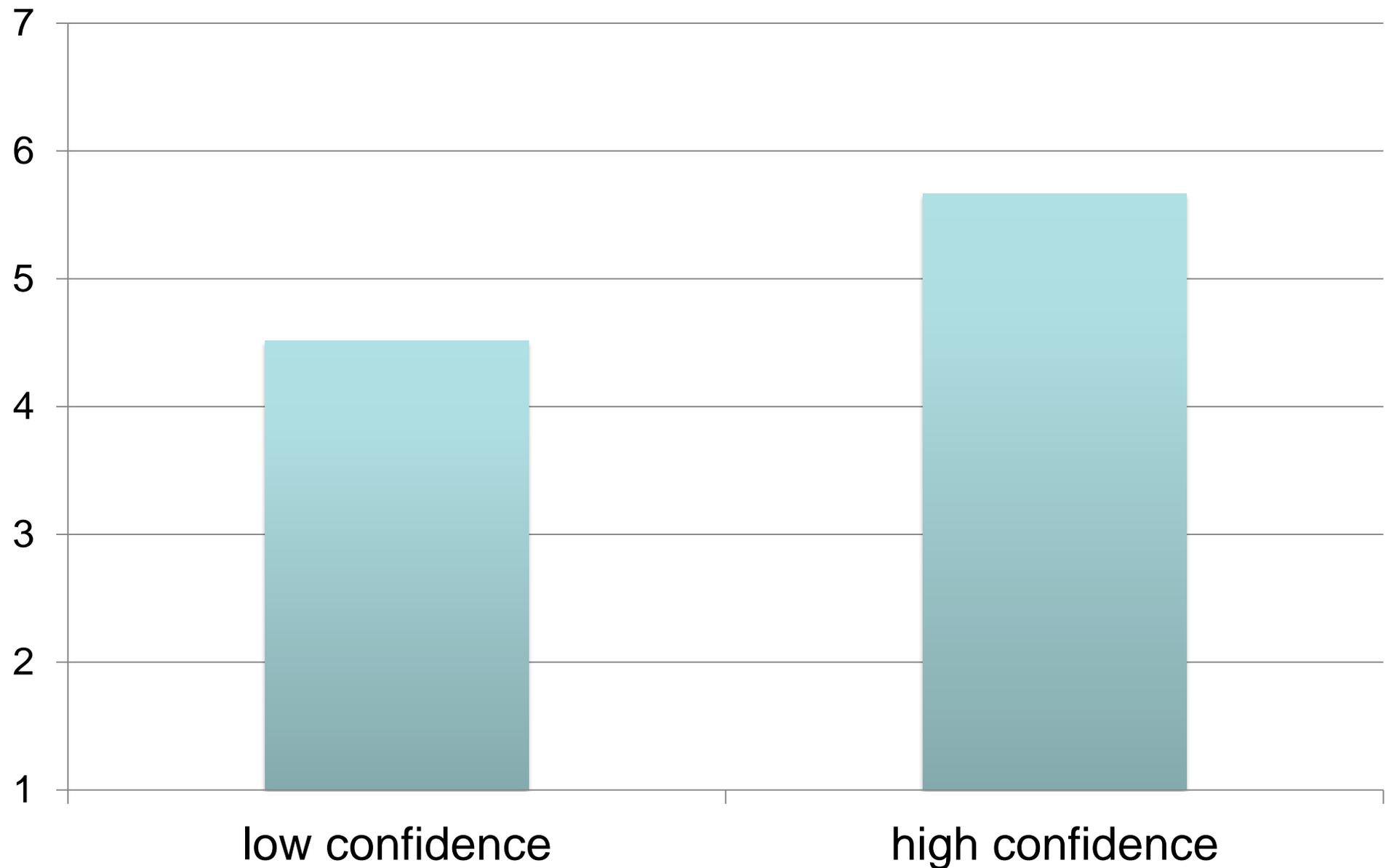
To elicit *low confidence*:

We ask that YOU ANSWER QUICKLY.

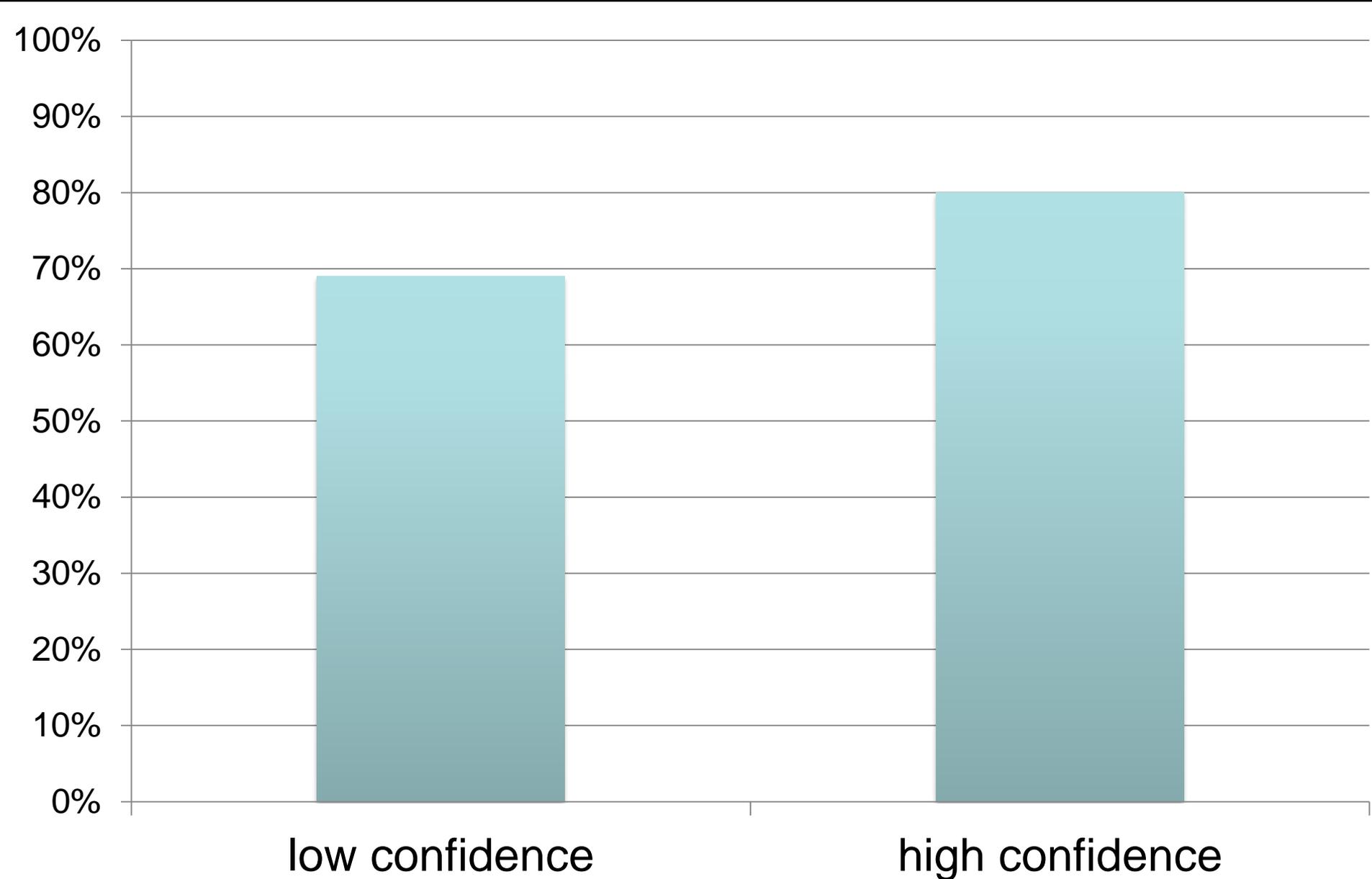
To elicit *high confidence*:

We ask that YOU THINK VERY CAREFULLY ABOUT YOUR ANSWER, and that you JUSTIFY IT WELL.

# Confidence in wrong answer



# % accepting the correct answer

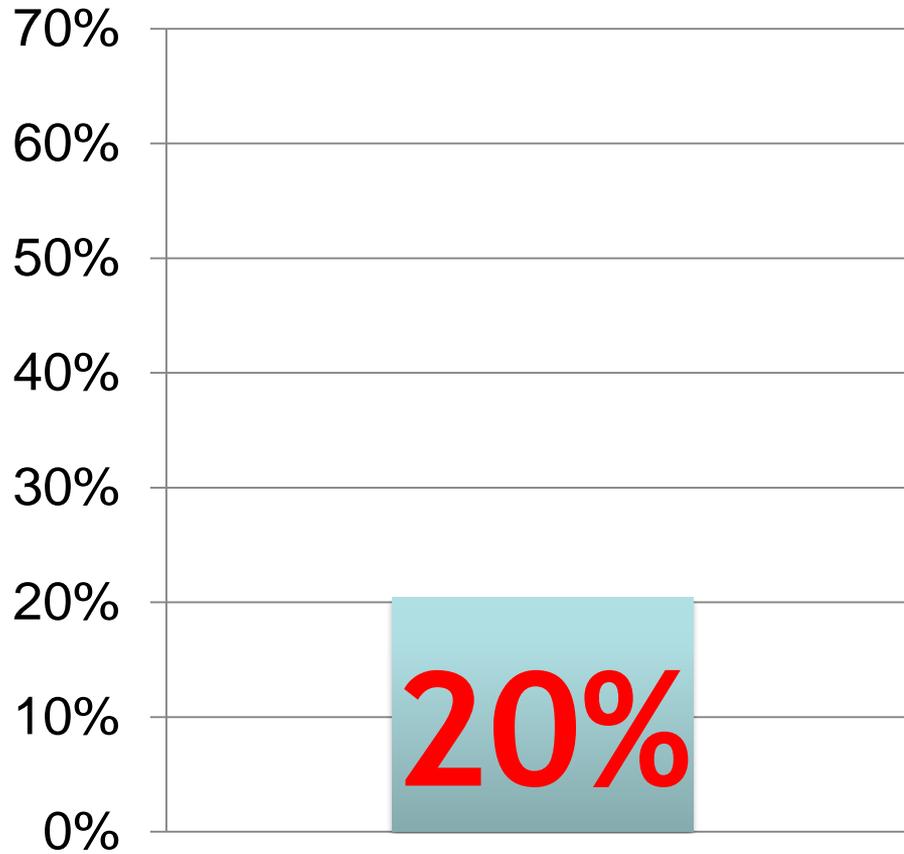




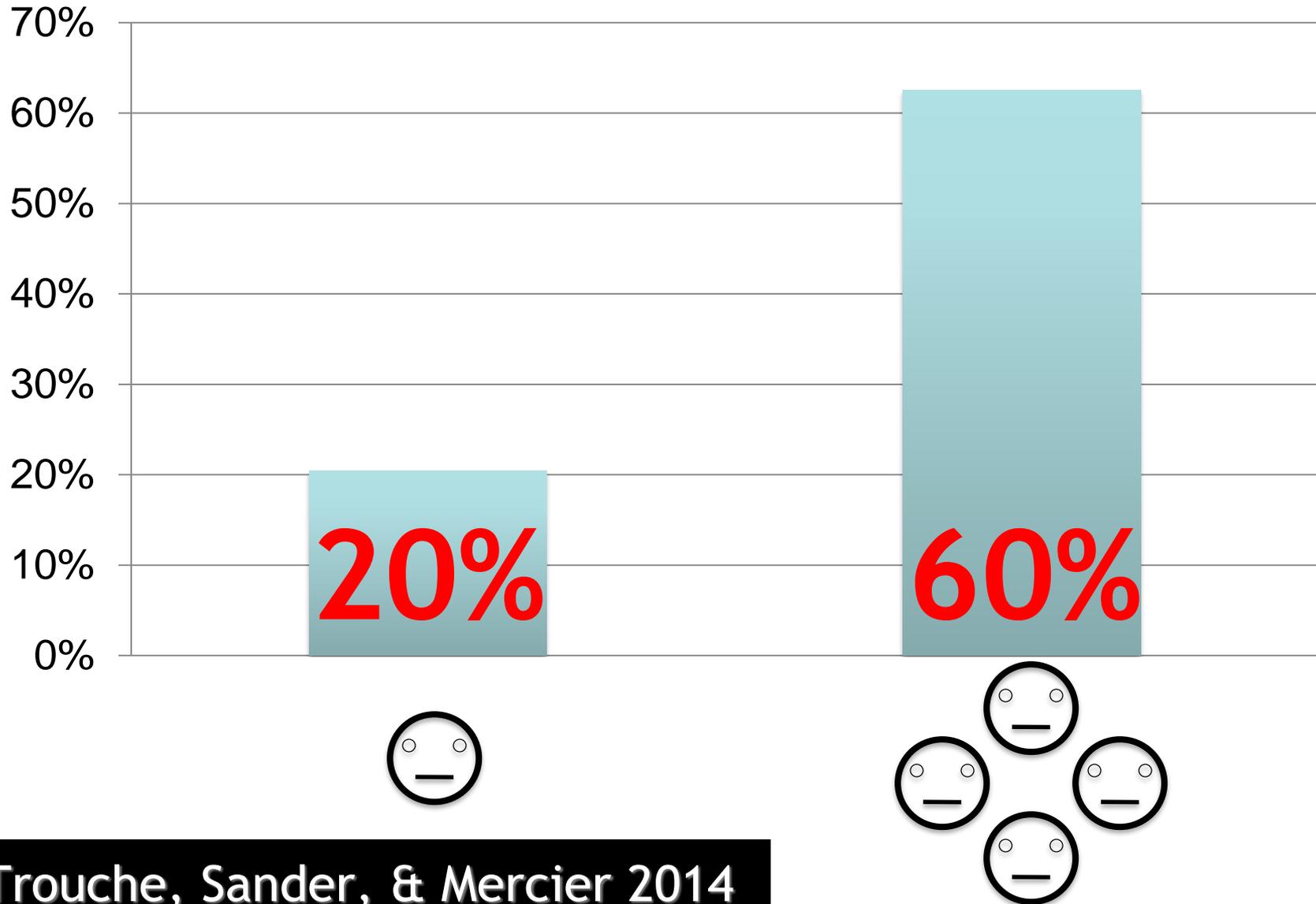
# Prediction 4

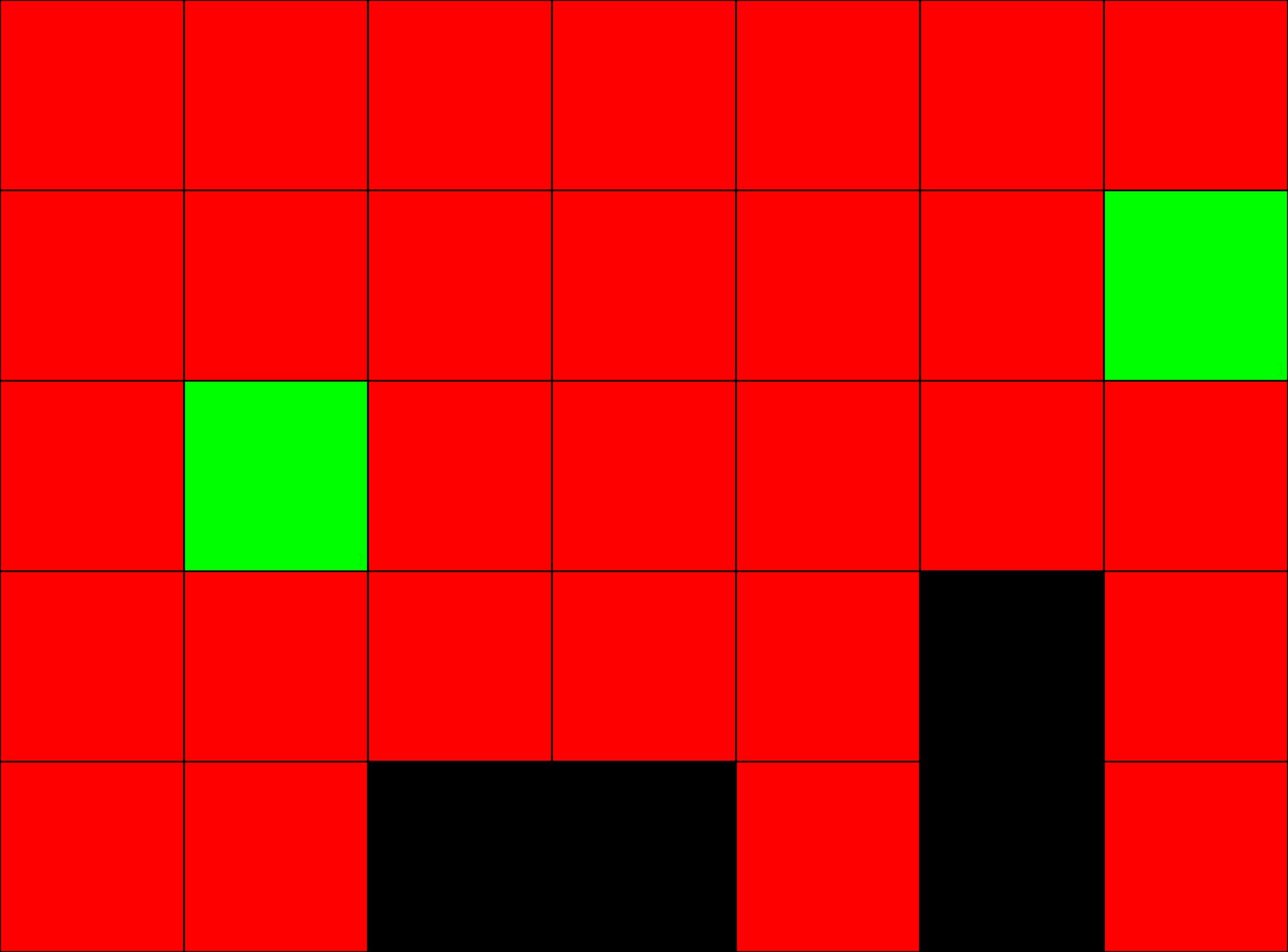
Groups outperform individuals on reasoning tasks

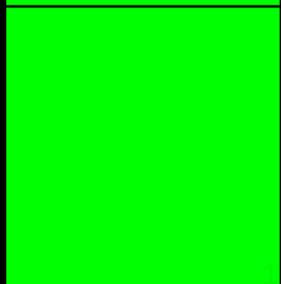
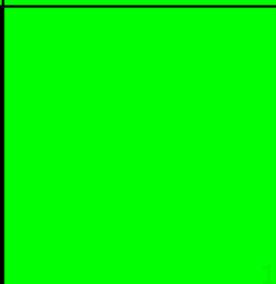
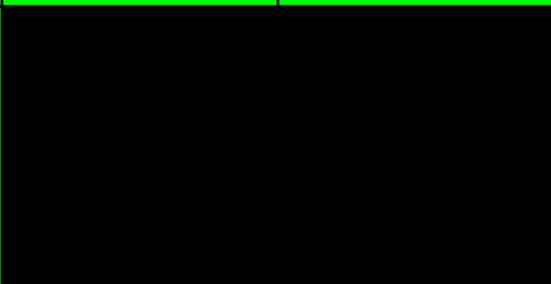
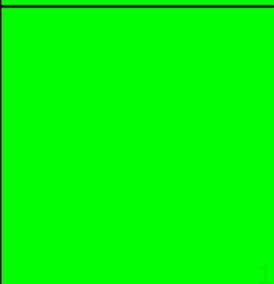
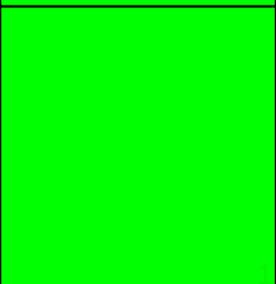
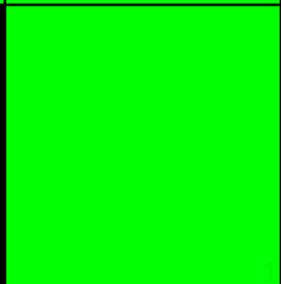
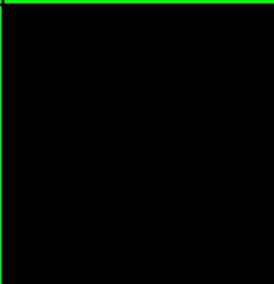
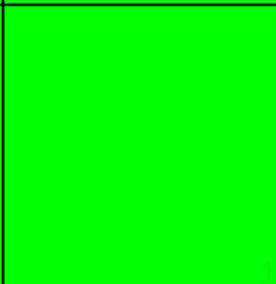
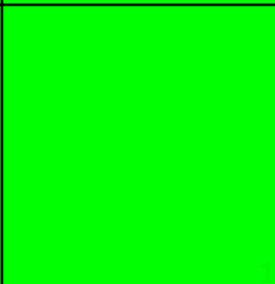
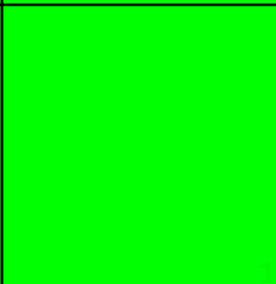
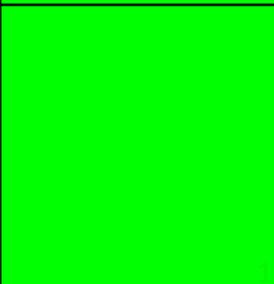
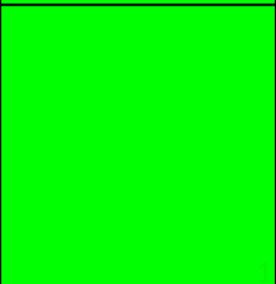
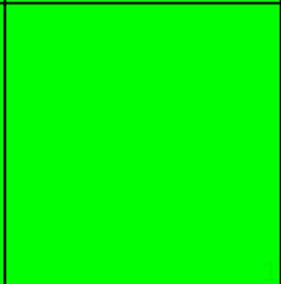
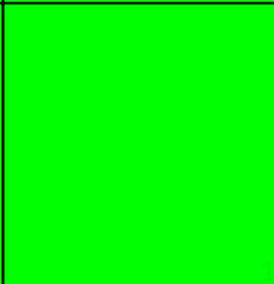
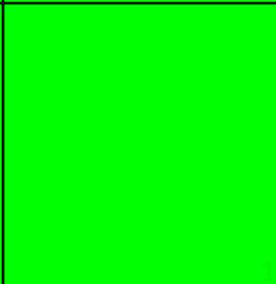
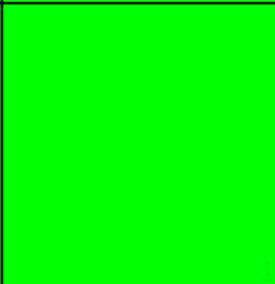
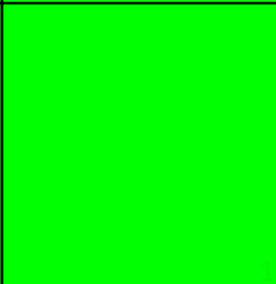
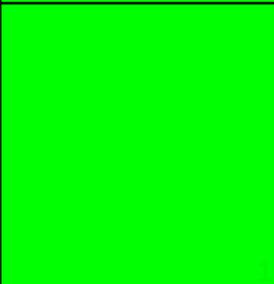
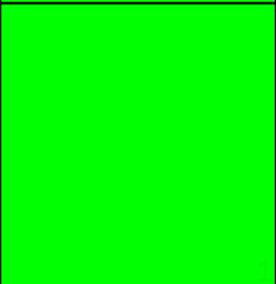
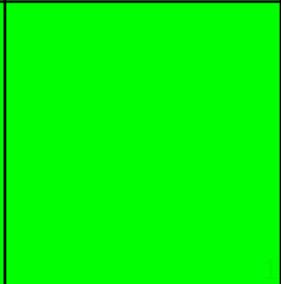
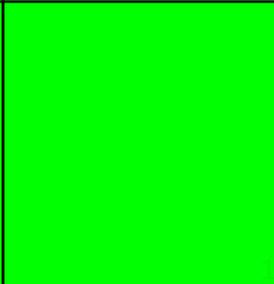
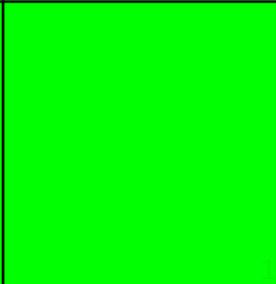
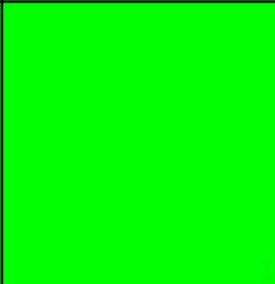
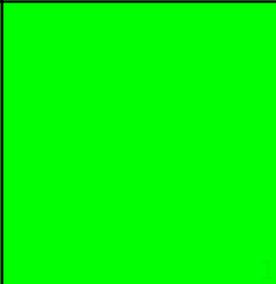
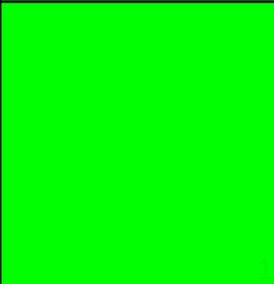
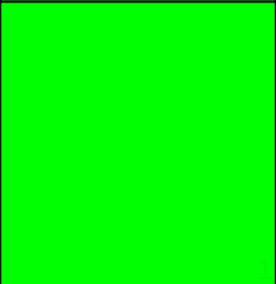
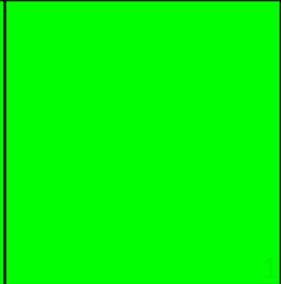
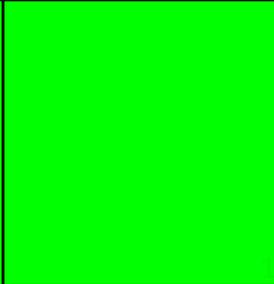
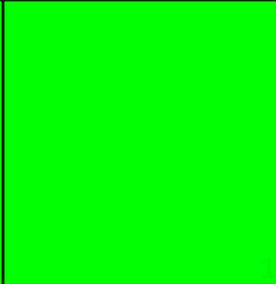
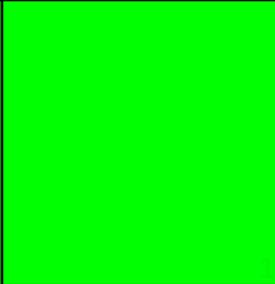
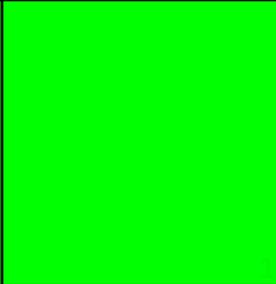
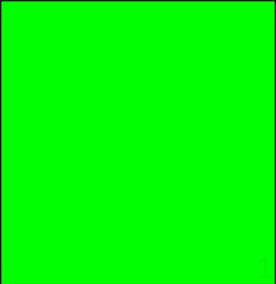
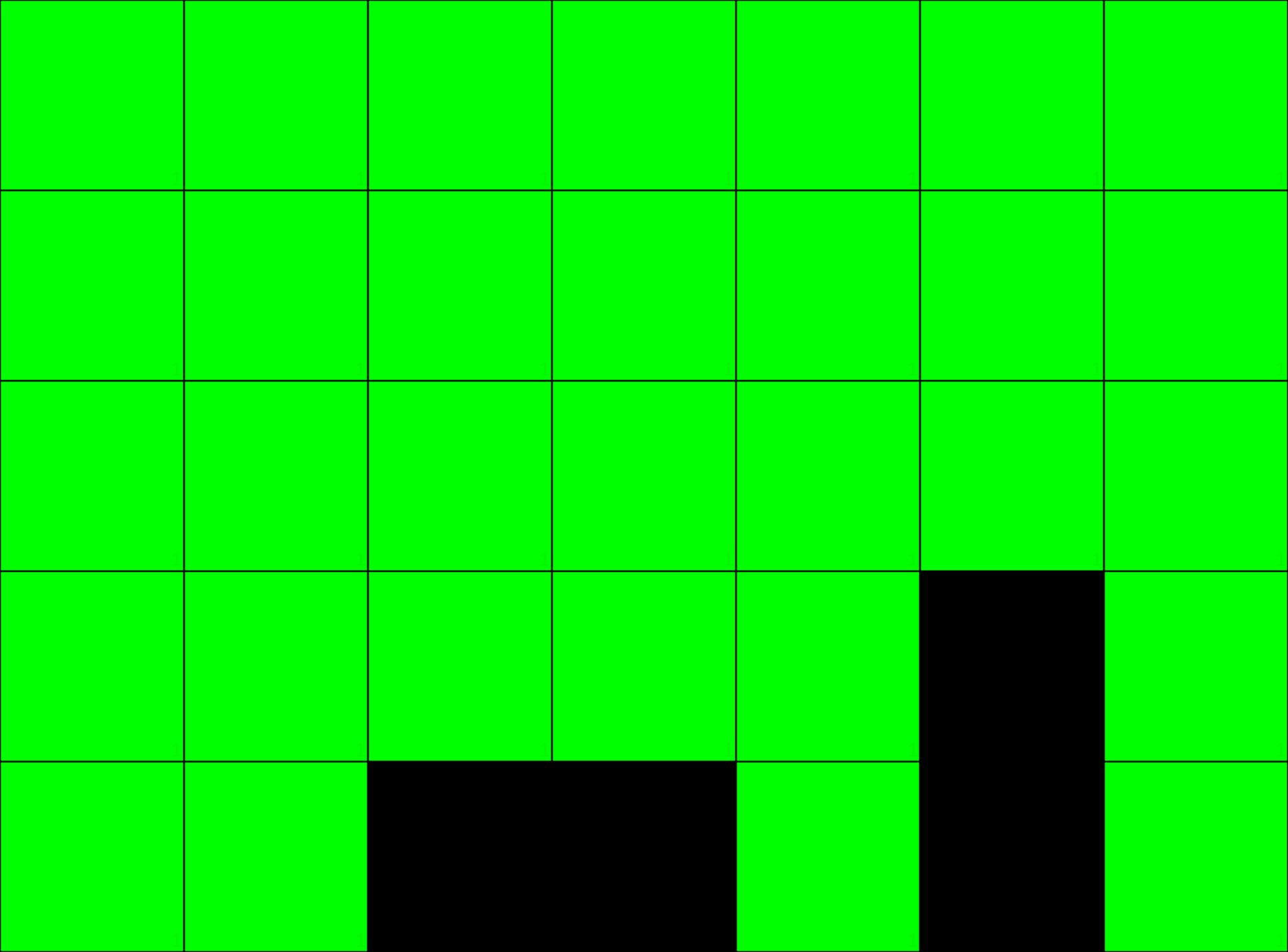
# Individual vs. group



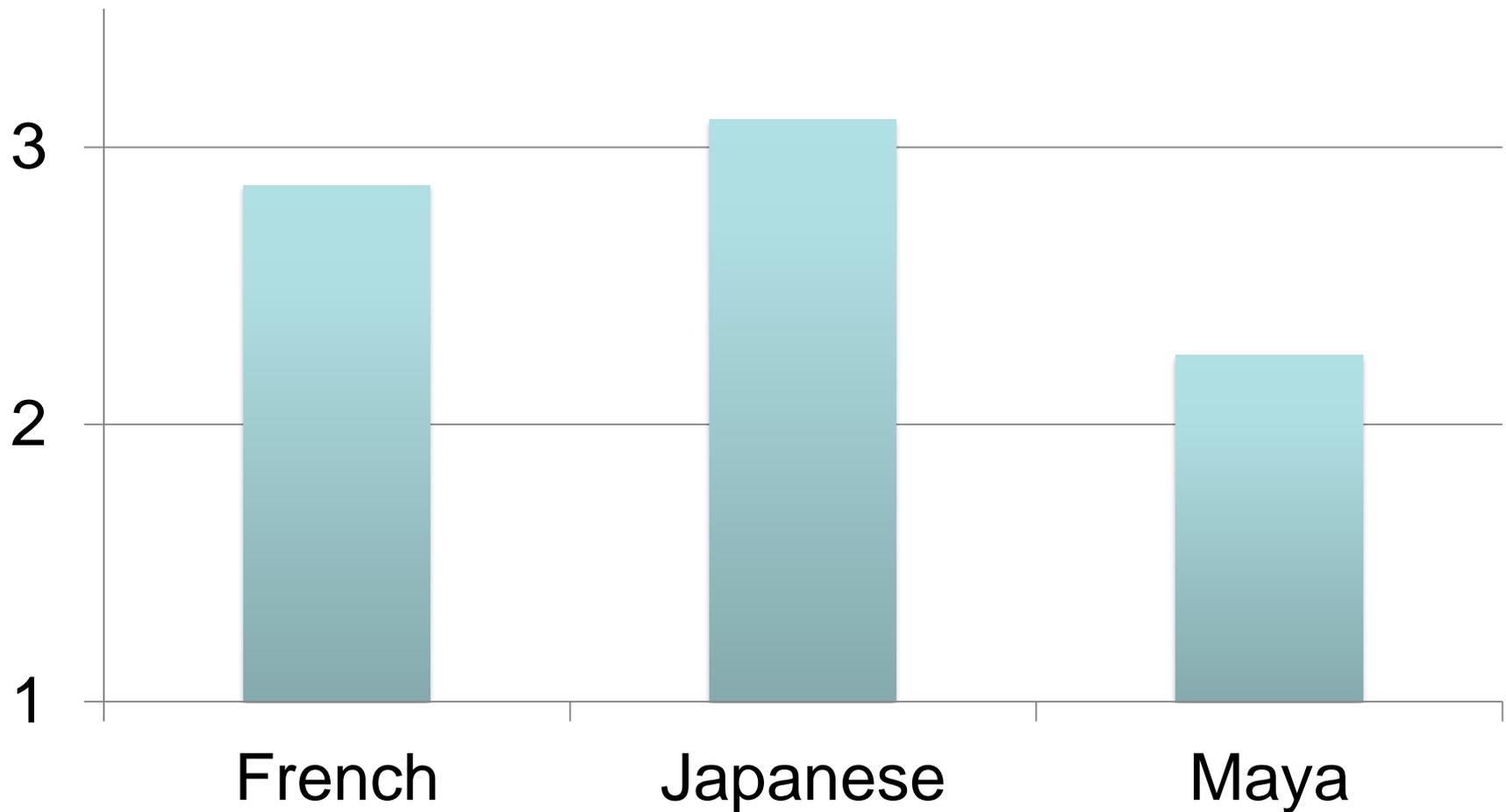
# Individual vs. group





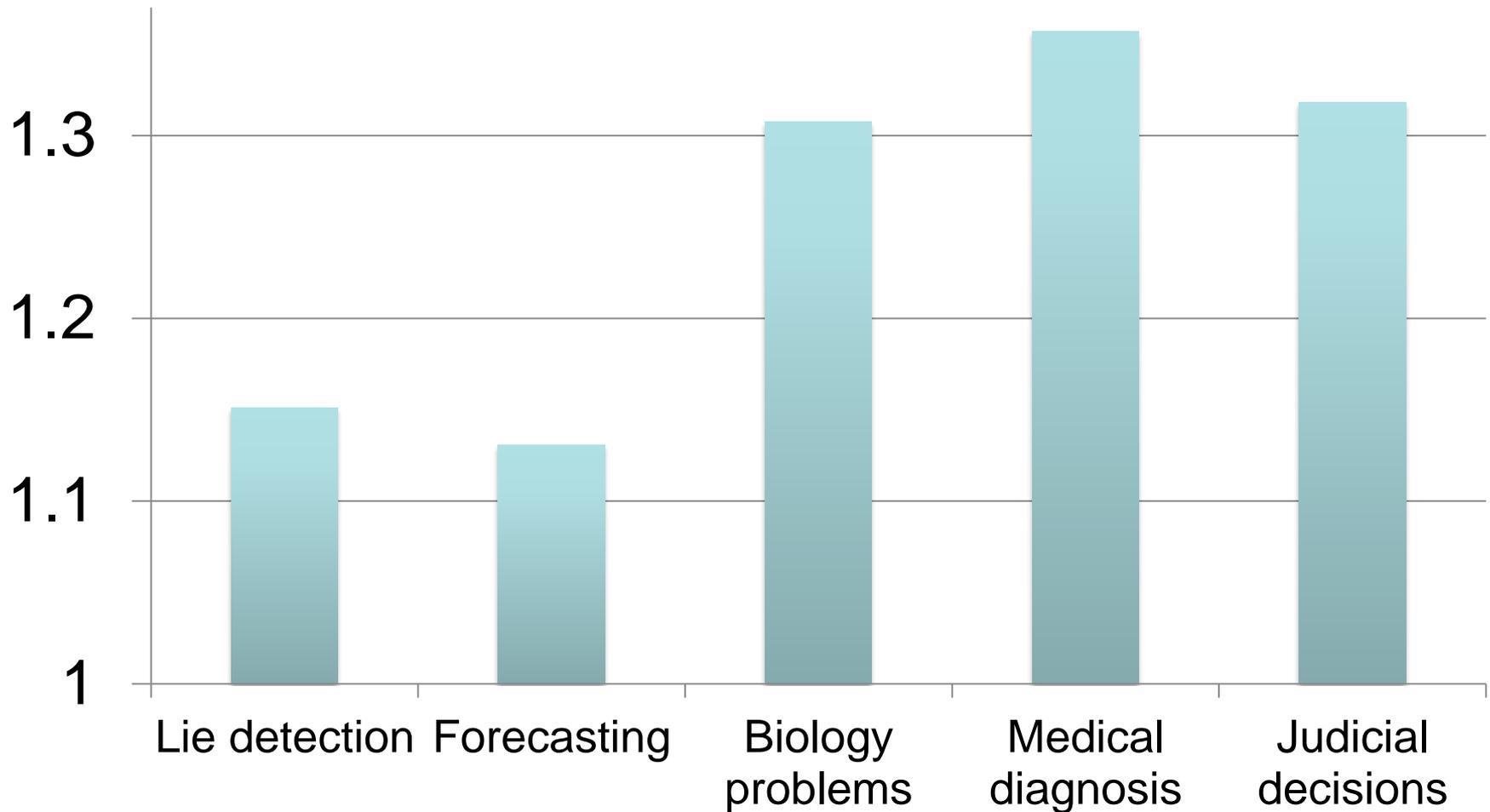


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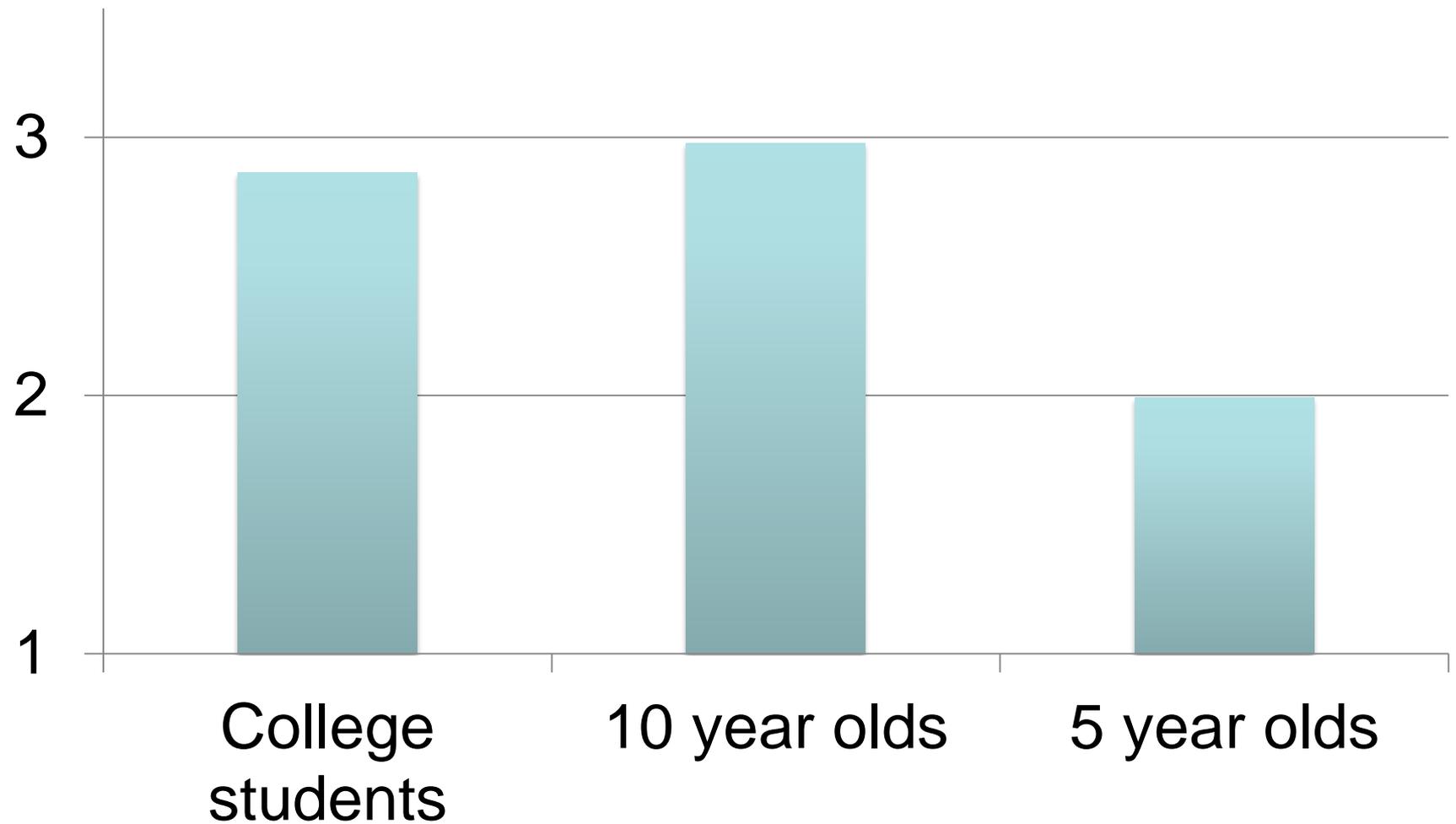
Trouche, Sander, & Mercier 2014; Mercier & al 2015; Castelain, Giroto, Jamet, & Mercier 2016

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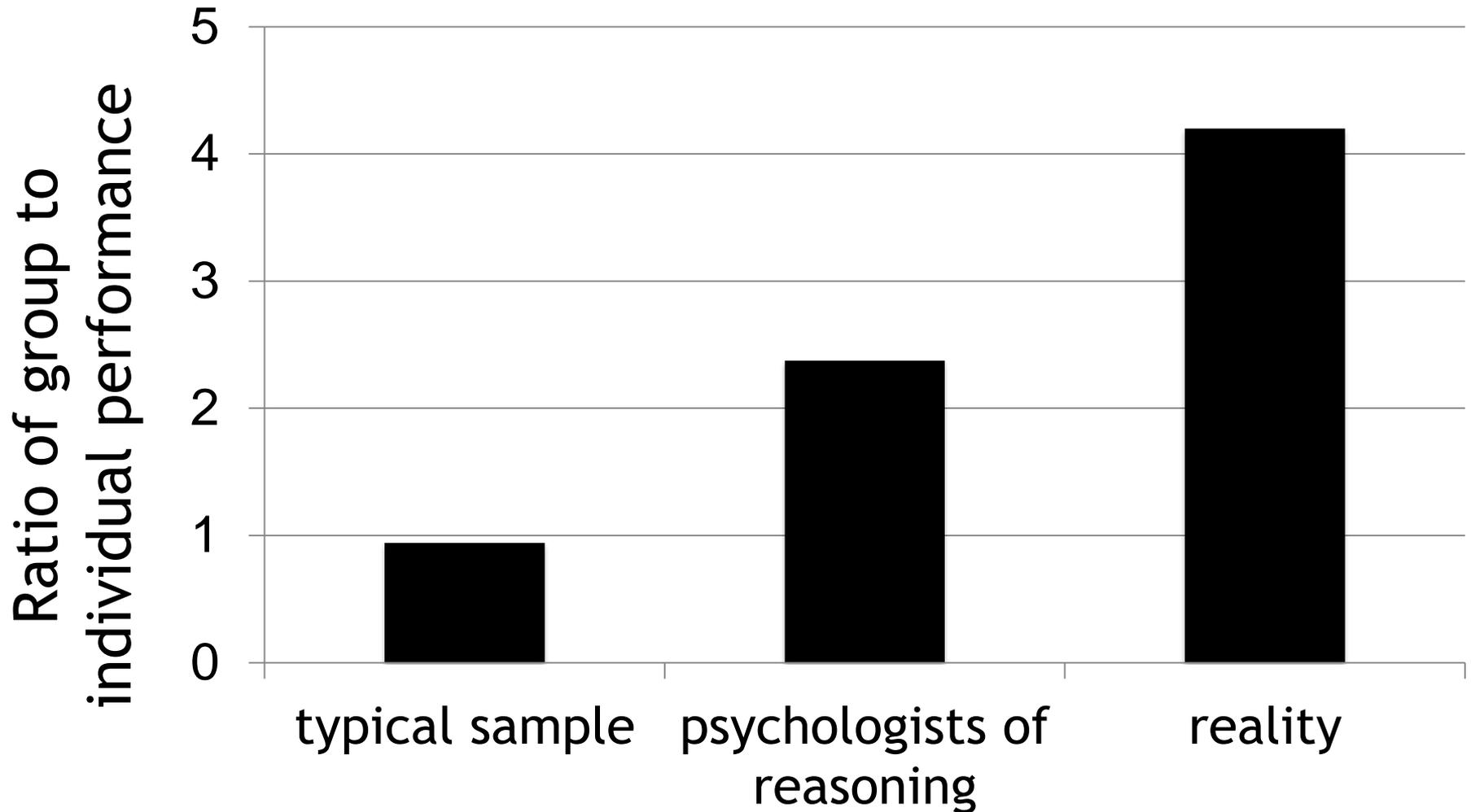


Klein & Epley 2015; Mellers & al 2014; Smith et al 2009;  
Hautz et al 2015; van Dijk et al 1994

# Individual vs. group



# Argumentation's efficacy is not intuitive



# Summary

Individual reason is overrated

Argumentation is underrated

Reason is for interacting: exchanging arguments and justifications

