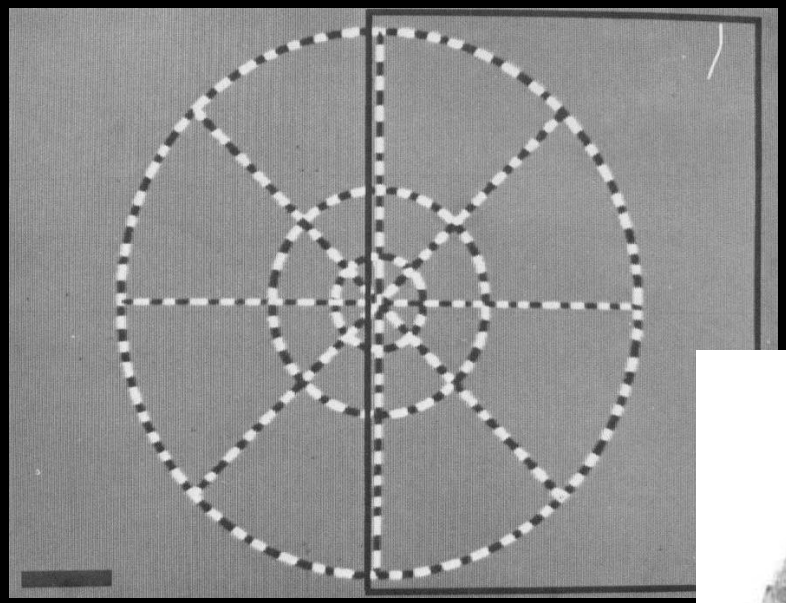
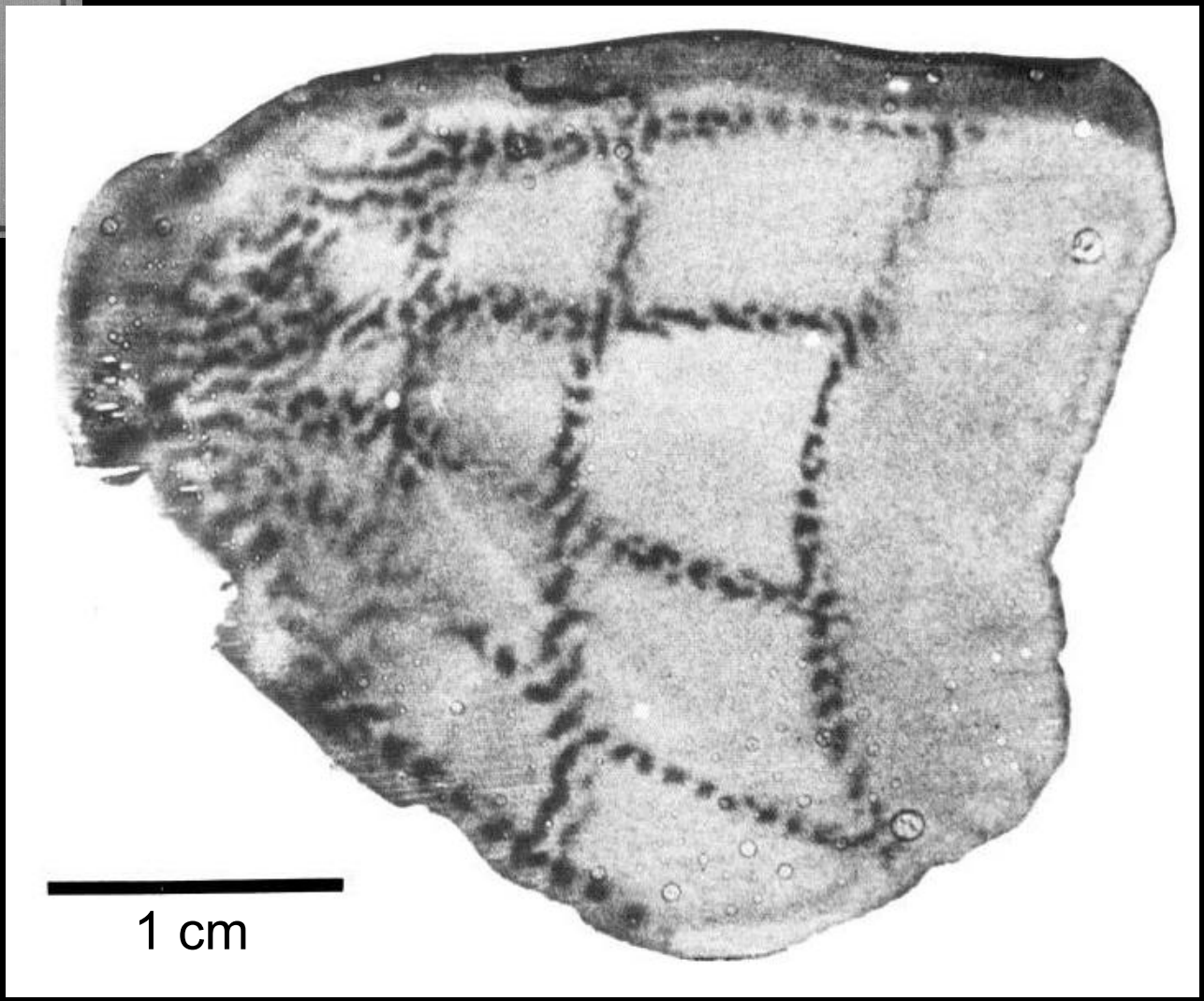
introduction to neuroscience:
the world we perceive –
the world nonexistent

jonas kubilius | nacionalinė moksleivių akademija | 1 july 2009

retinotopy



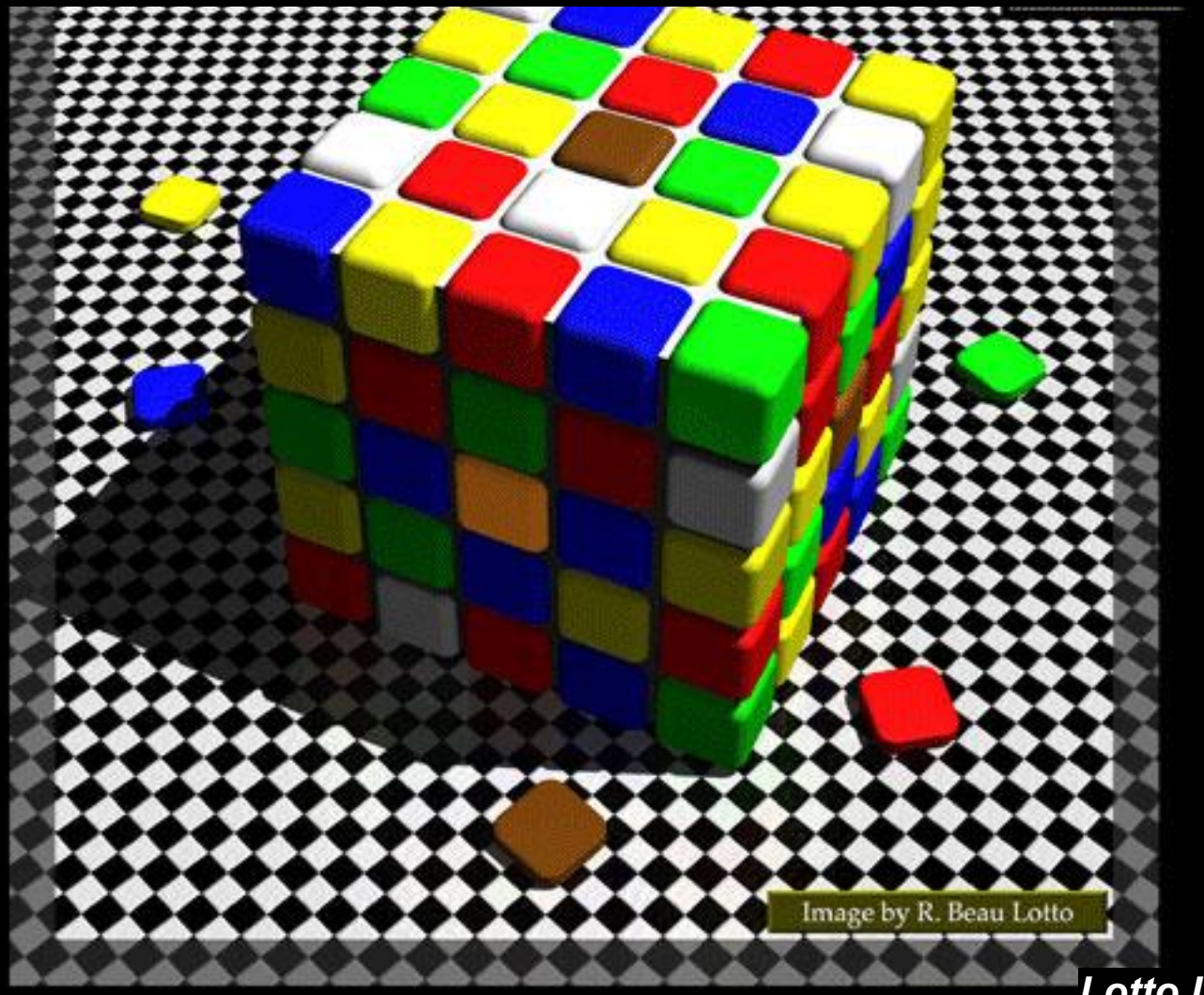


Tootell et al., J. Neurosci. (1988)

plan

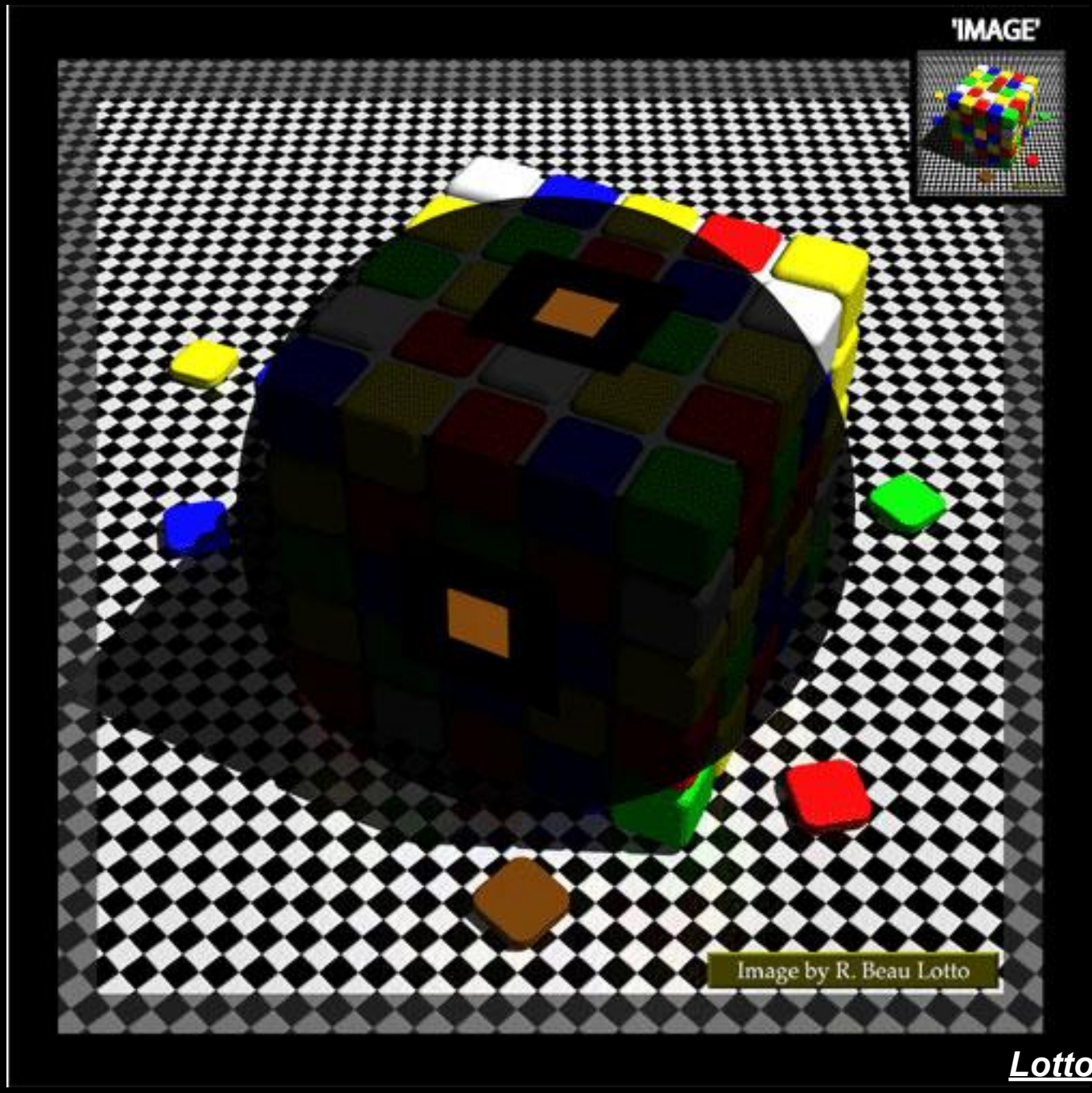
how plastic is our brain?
if plastic, then can we distort the system?

color tile illusion



Lotto Lab

color tile illusion

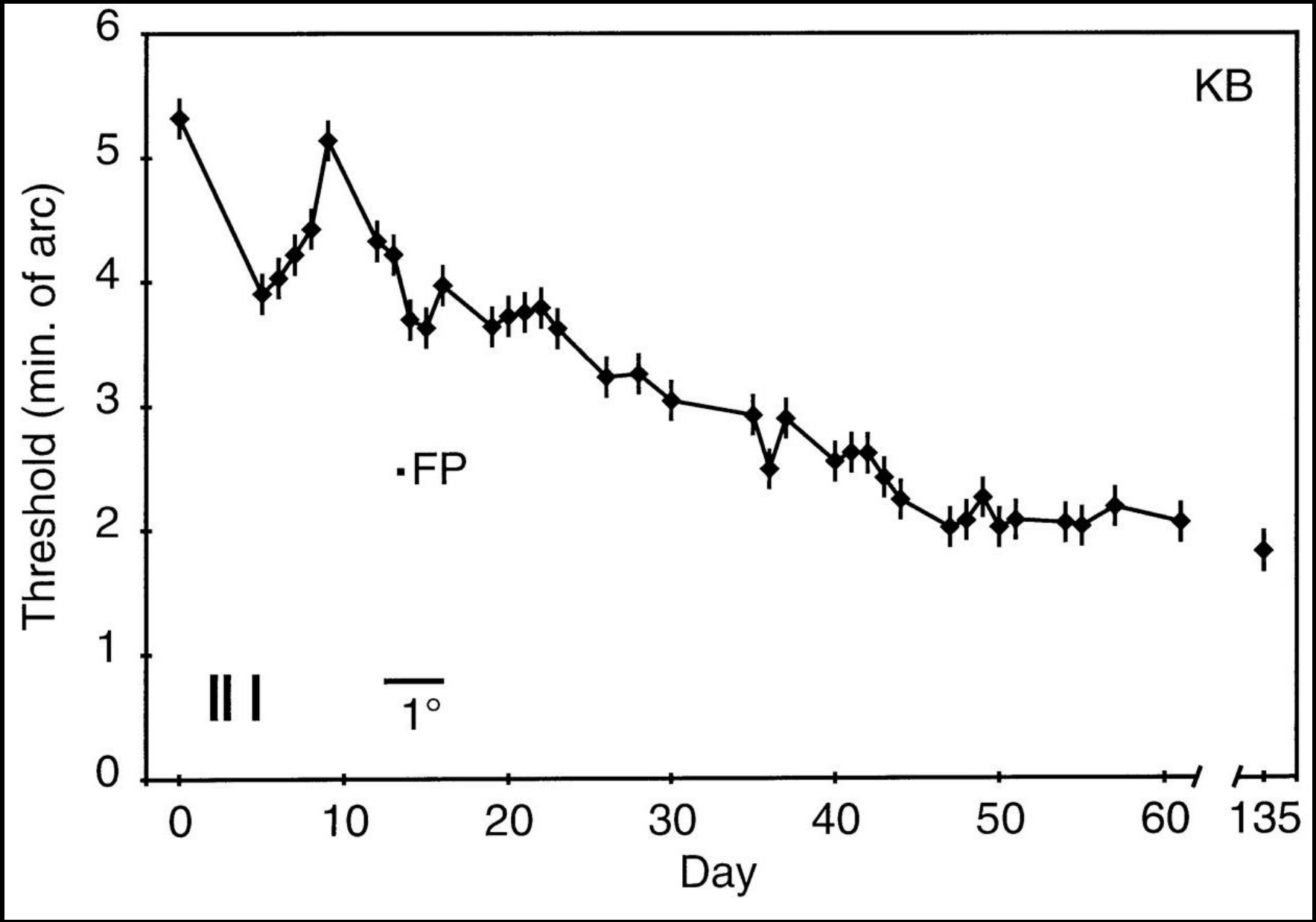


Lotto Lab

perceptual learning

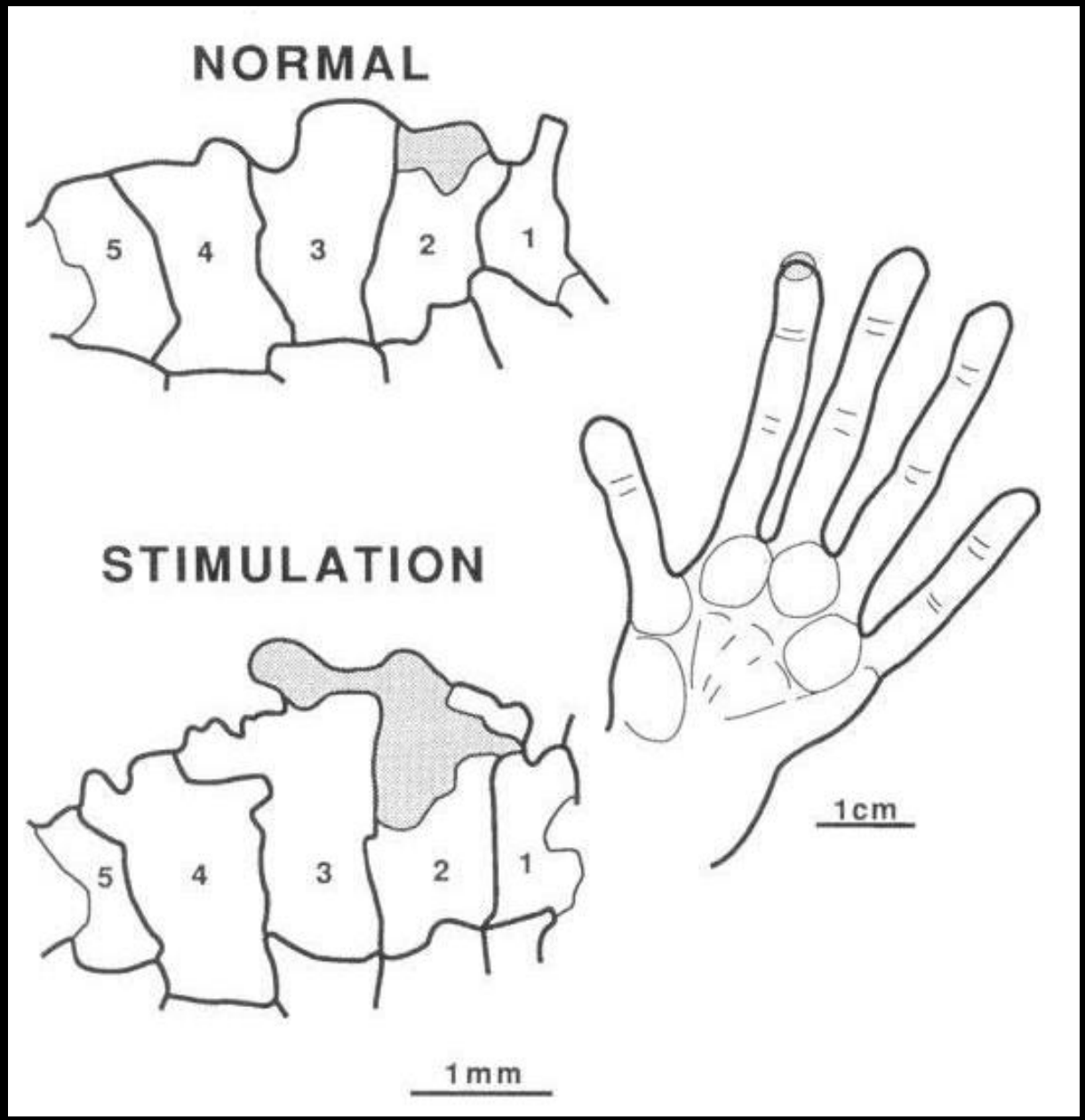
Jules Verne, ***Robur the Conquerer***, **from *Wikisource***

perceptual learning



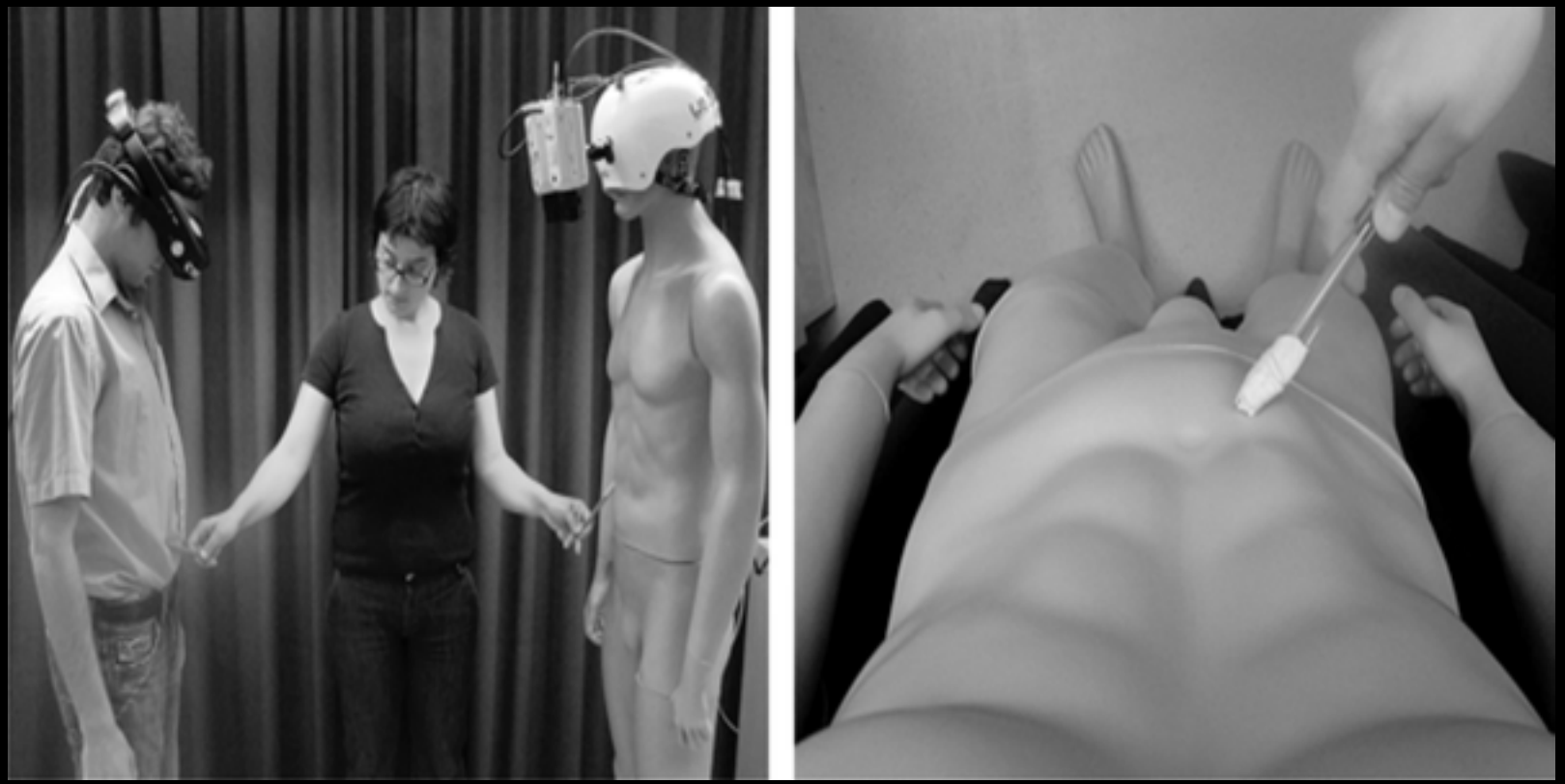
Chris et al., *J. Neurophysiol.* (1997)

somatosensory plasticity



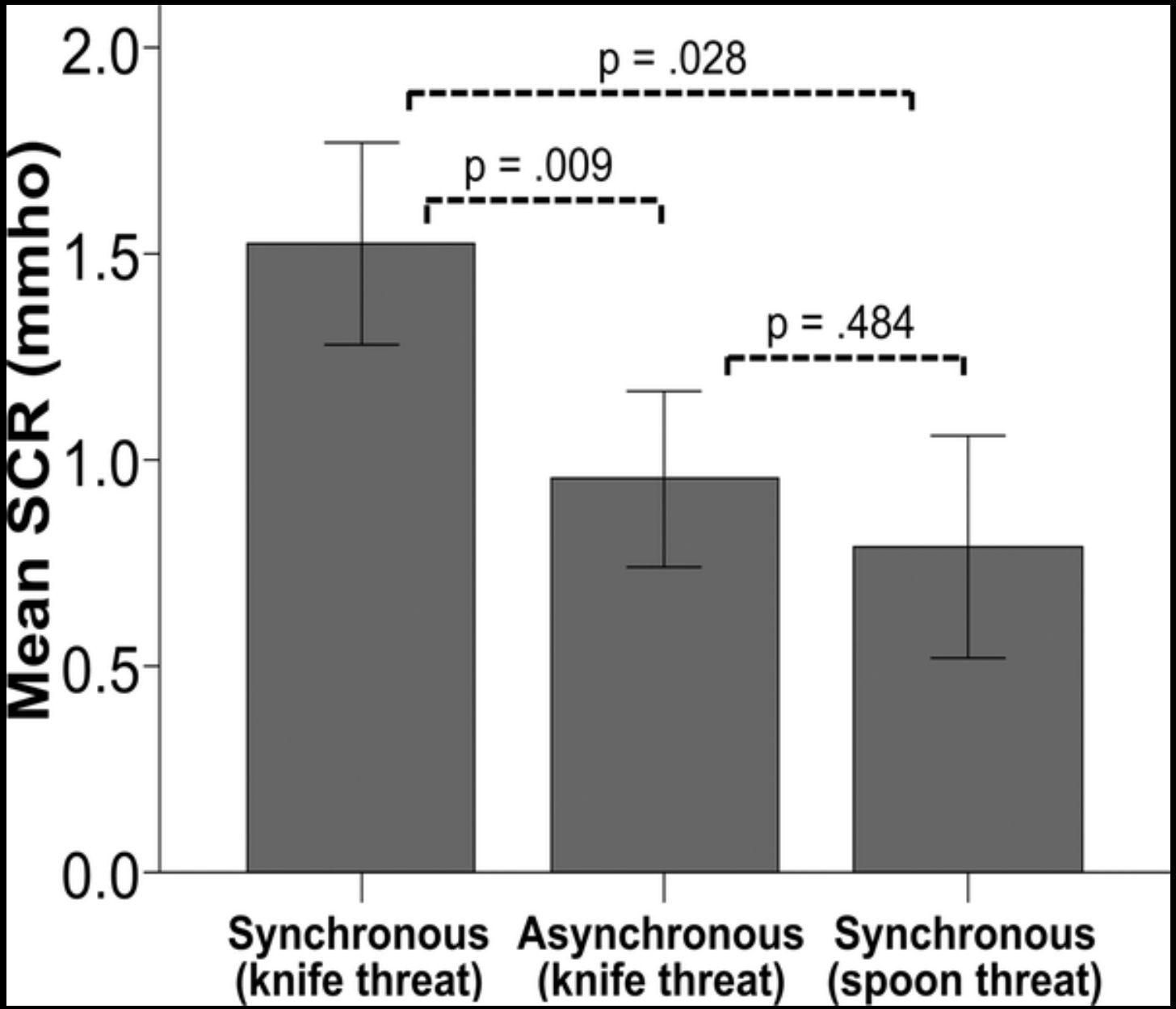
Jenkins et al., J. Physiol. (1990)

out-of-body experience



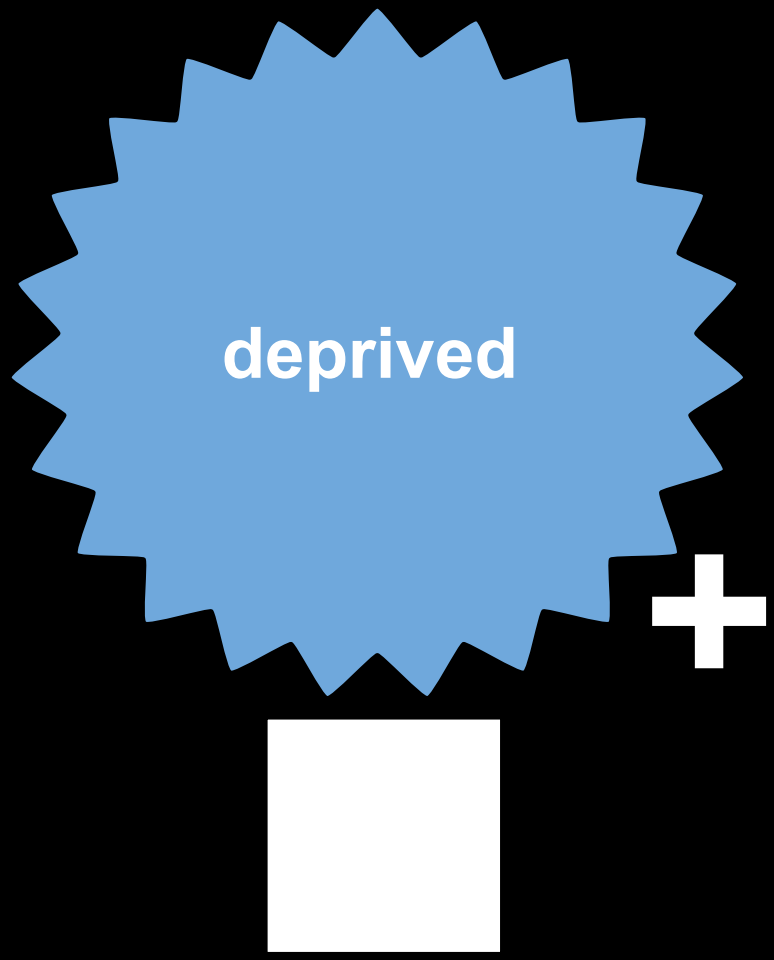
Petkova & Ehrsson, *PLoS ONE* (2008)

out-of-body experience

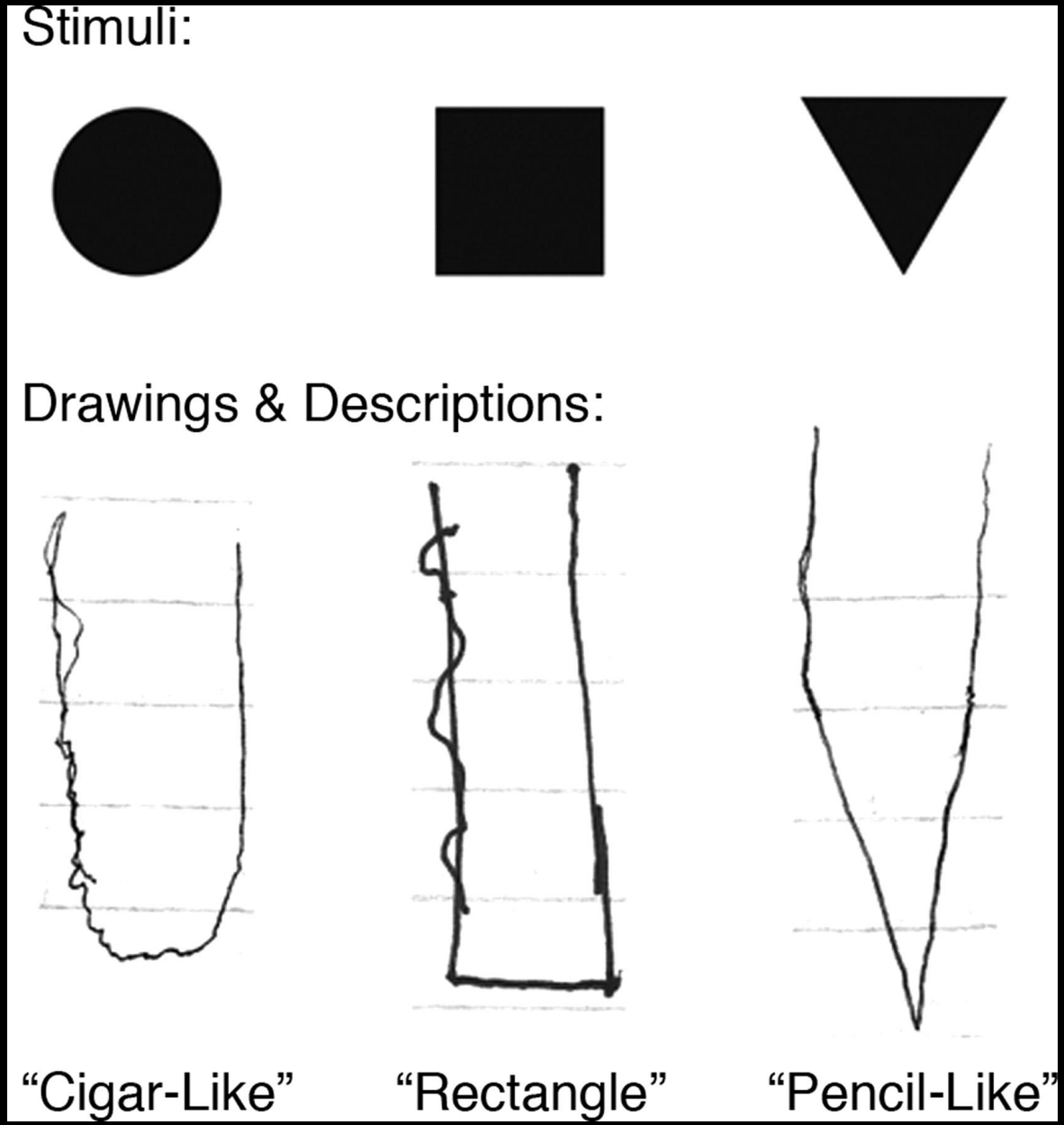


Petkova & Ehrsson, *PLoS ONE* (2008)

visual plasticity

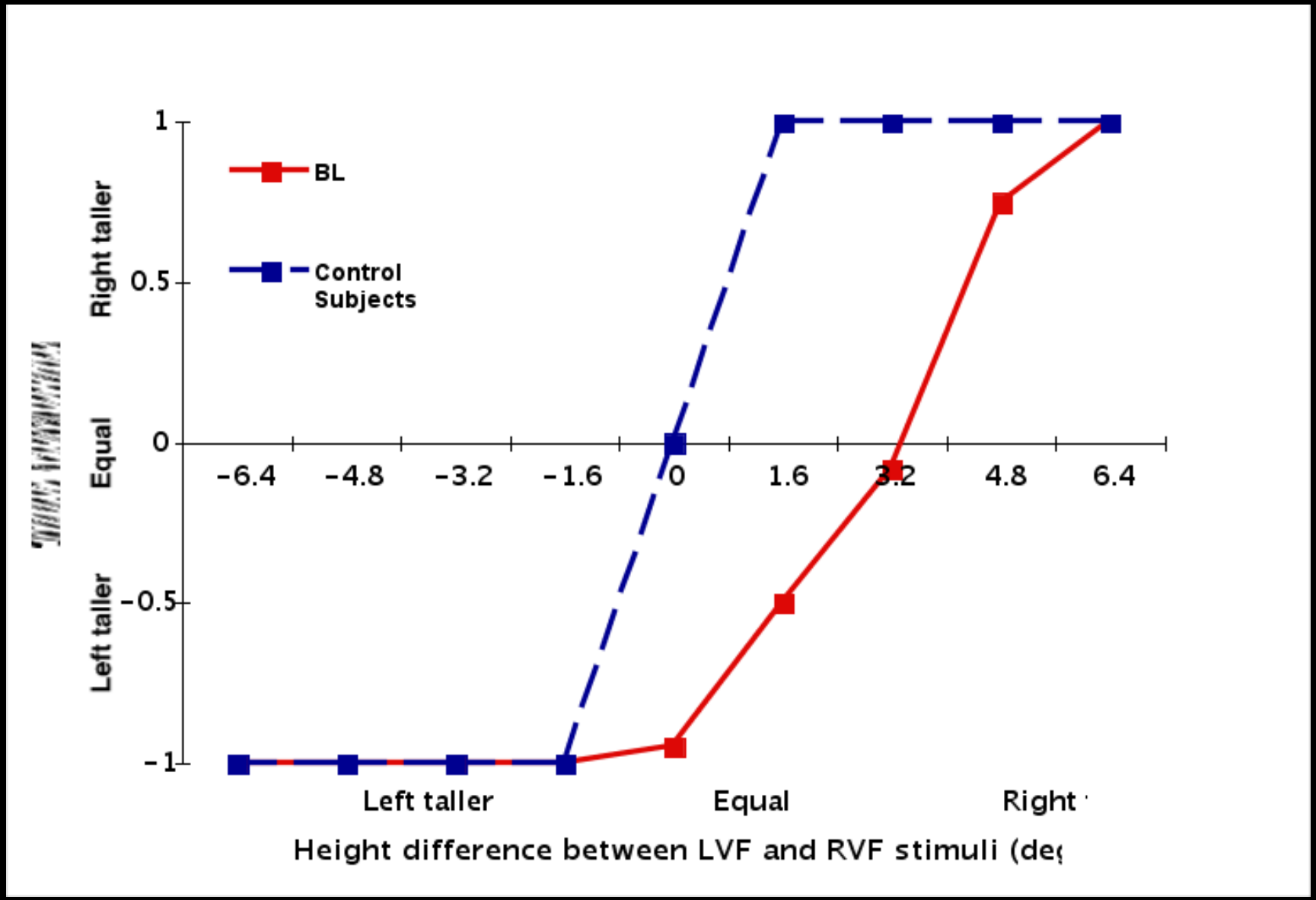


visual plasticity



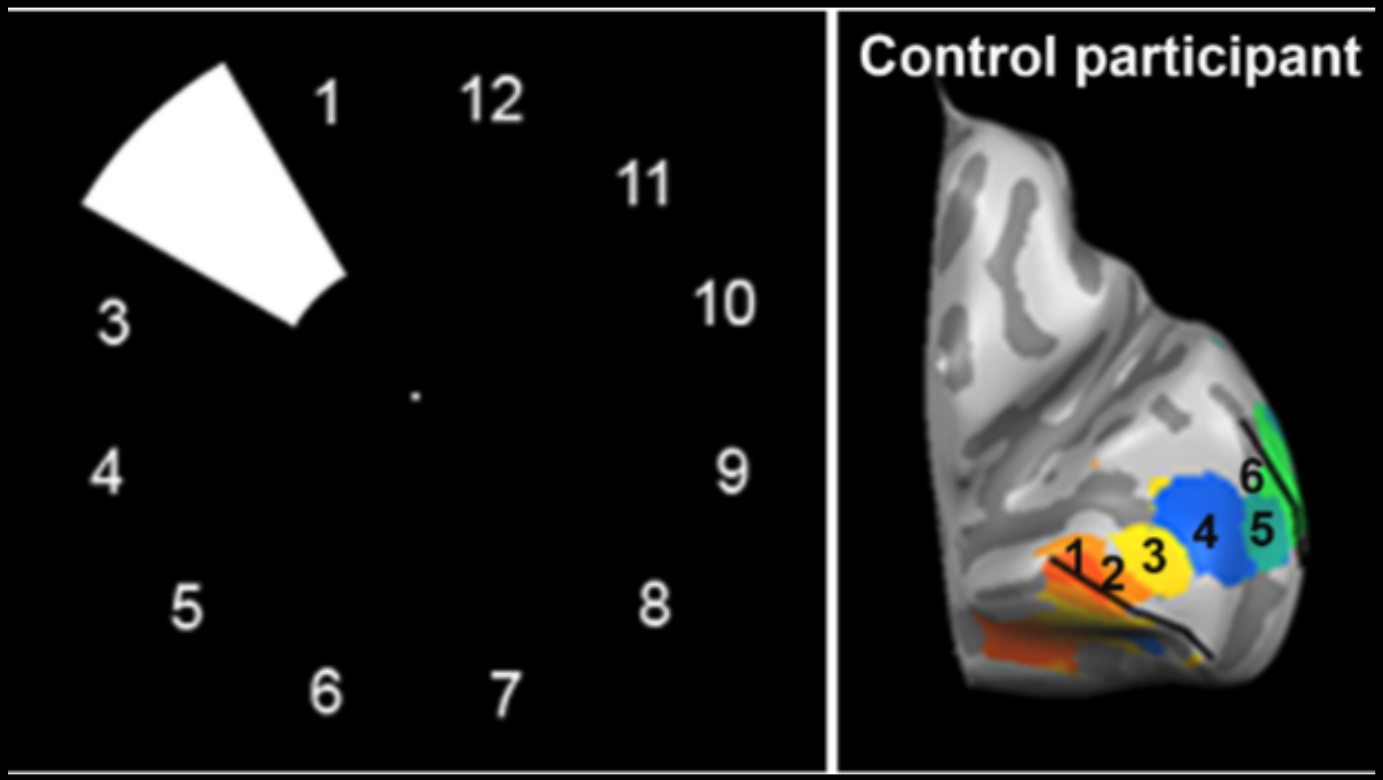
Dilks et al., *J. Neurosci.* (2007)

visual plasticity



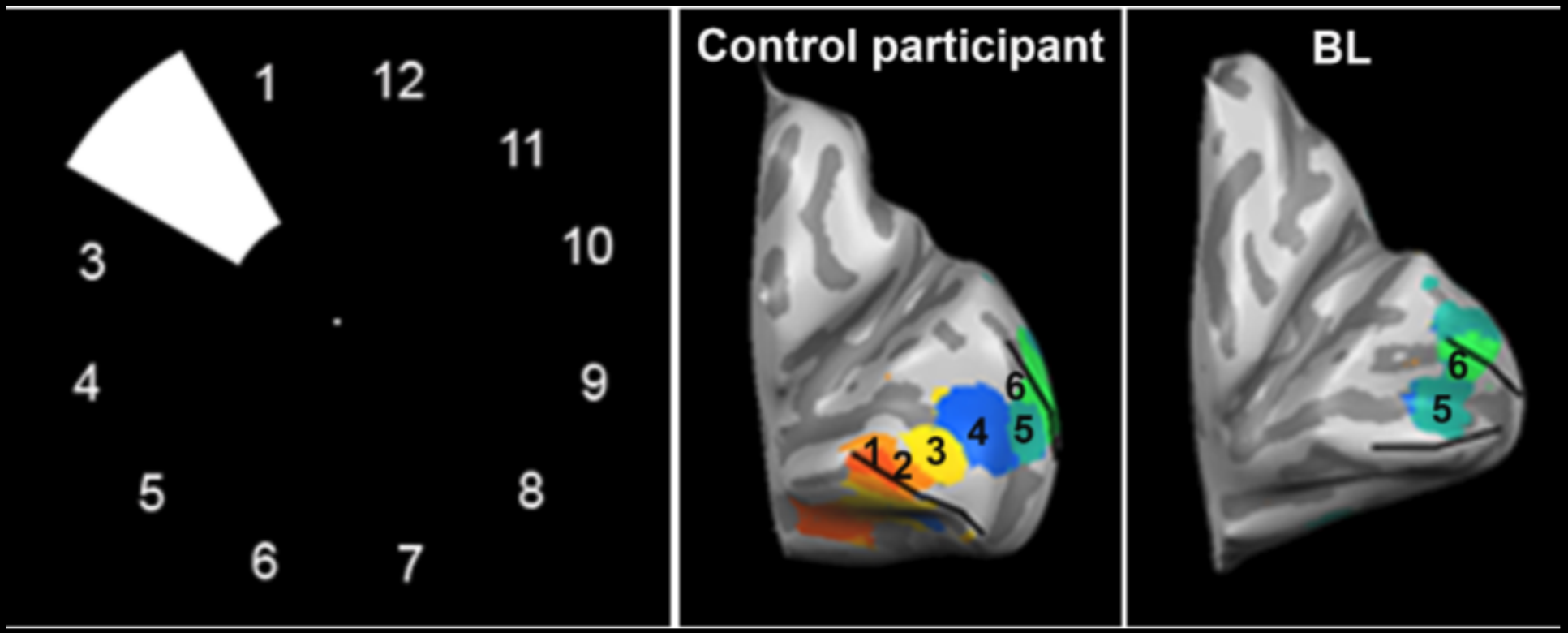
Dilks et al., *J. Neurosci.* (2007)

visual plasticity



Dilks et al., *J. Neurosci.* (2007)

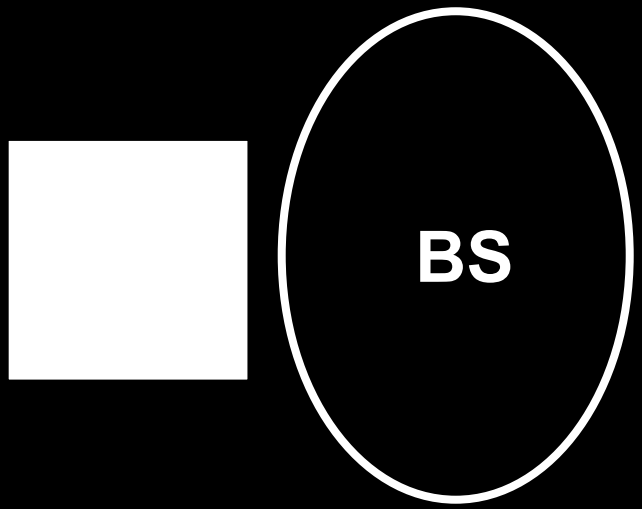
visual plasticity



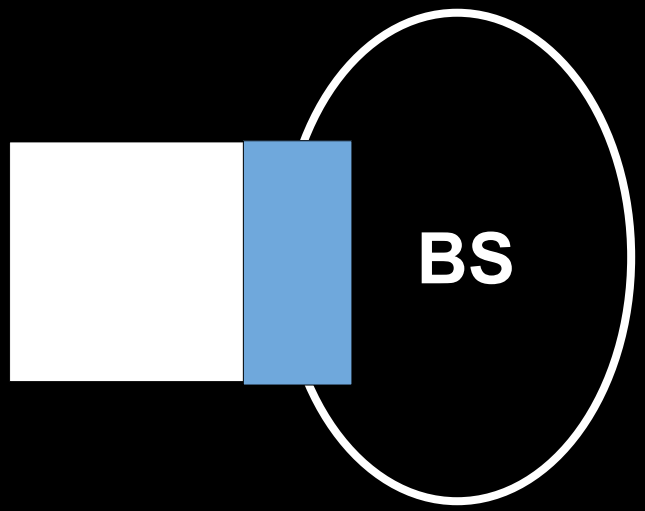
Dilks et al., *J. Neurosci.* (2007)

blind spot demo

blind spot demo



stimulus

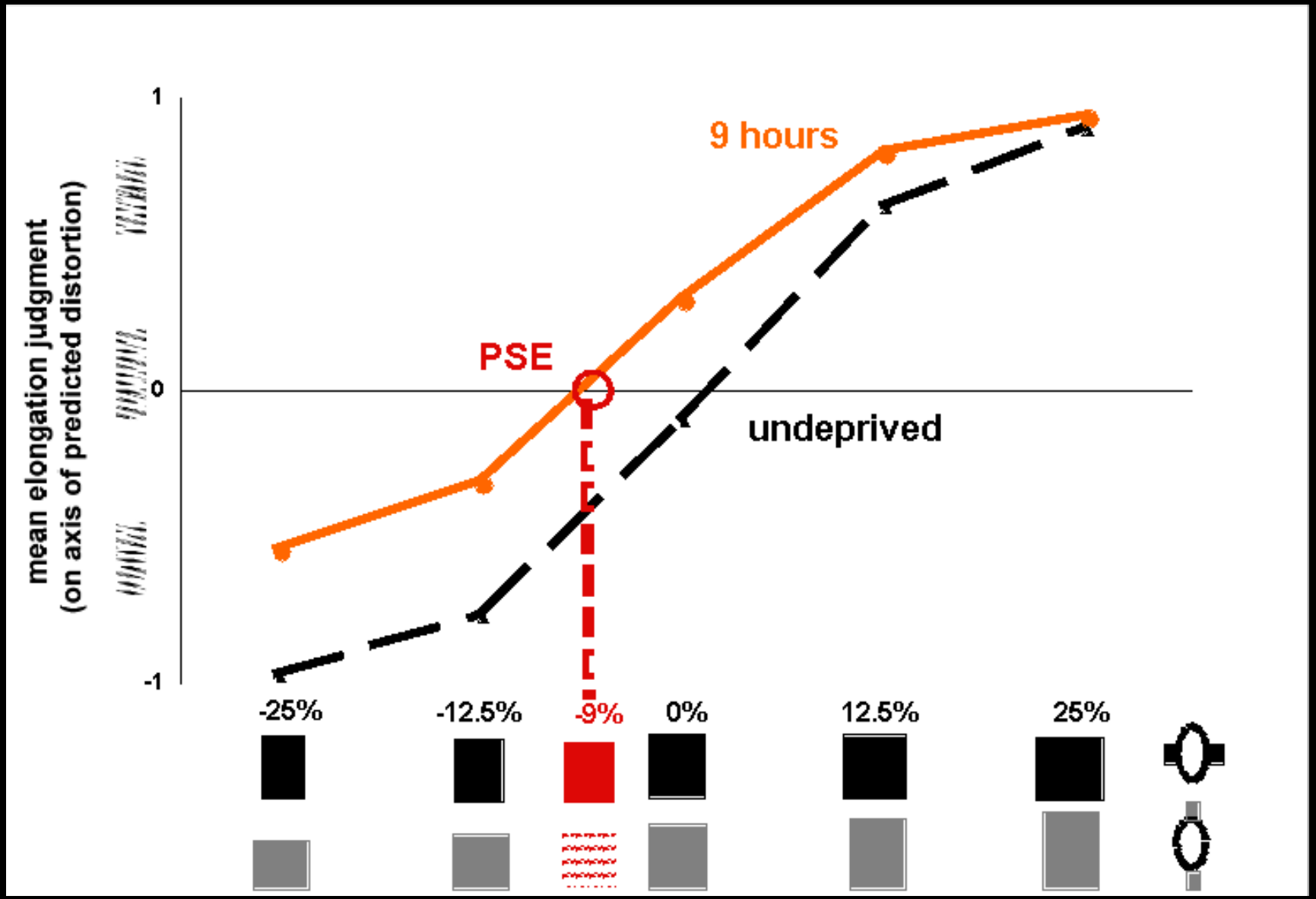


percept

blind spot demo

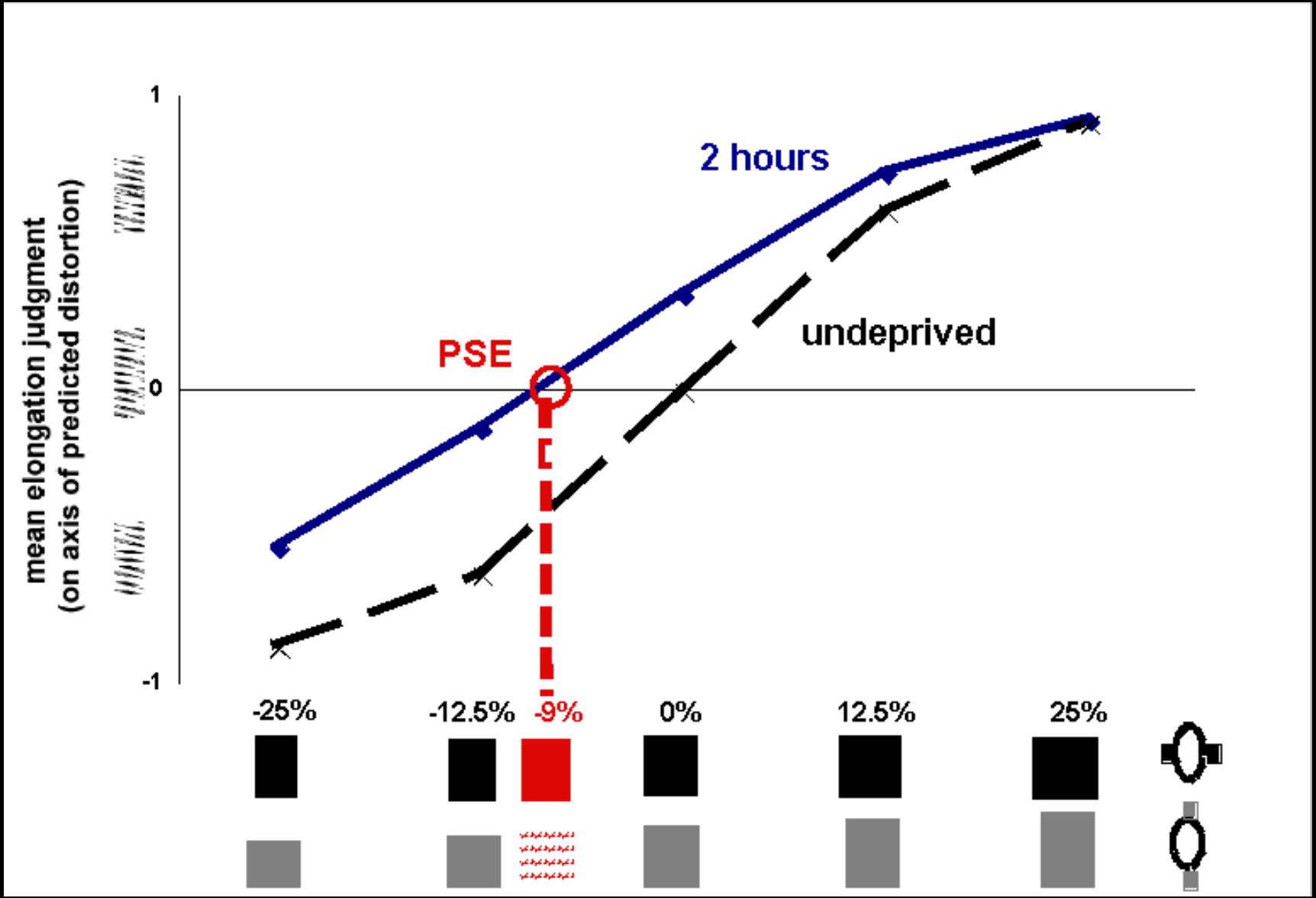
your perception will be distorted in:
9 hours
2 hours
10 minutes
1 second

blind spot demo



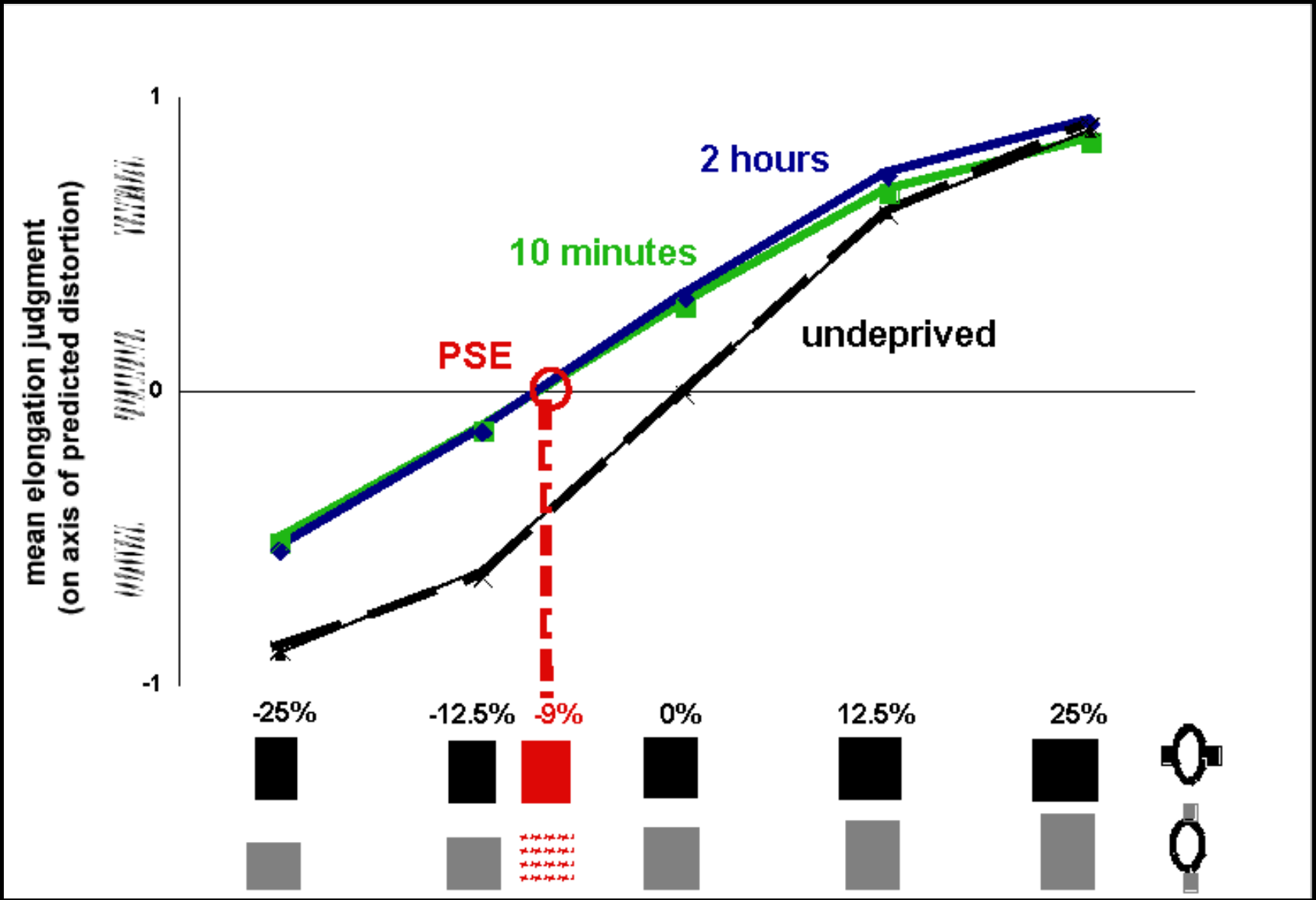
Dilks et al., *J. Neurosci.* (2007)

blind spot demo



Dilks et al., *J. Neurosci.* (in press)

blind spot demo



Dilks et al., *J. Neurosci.* (in press)

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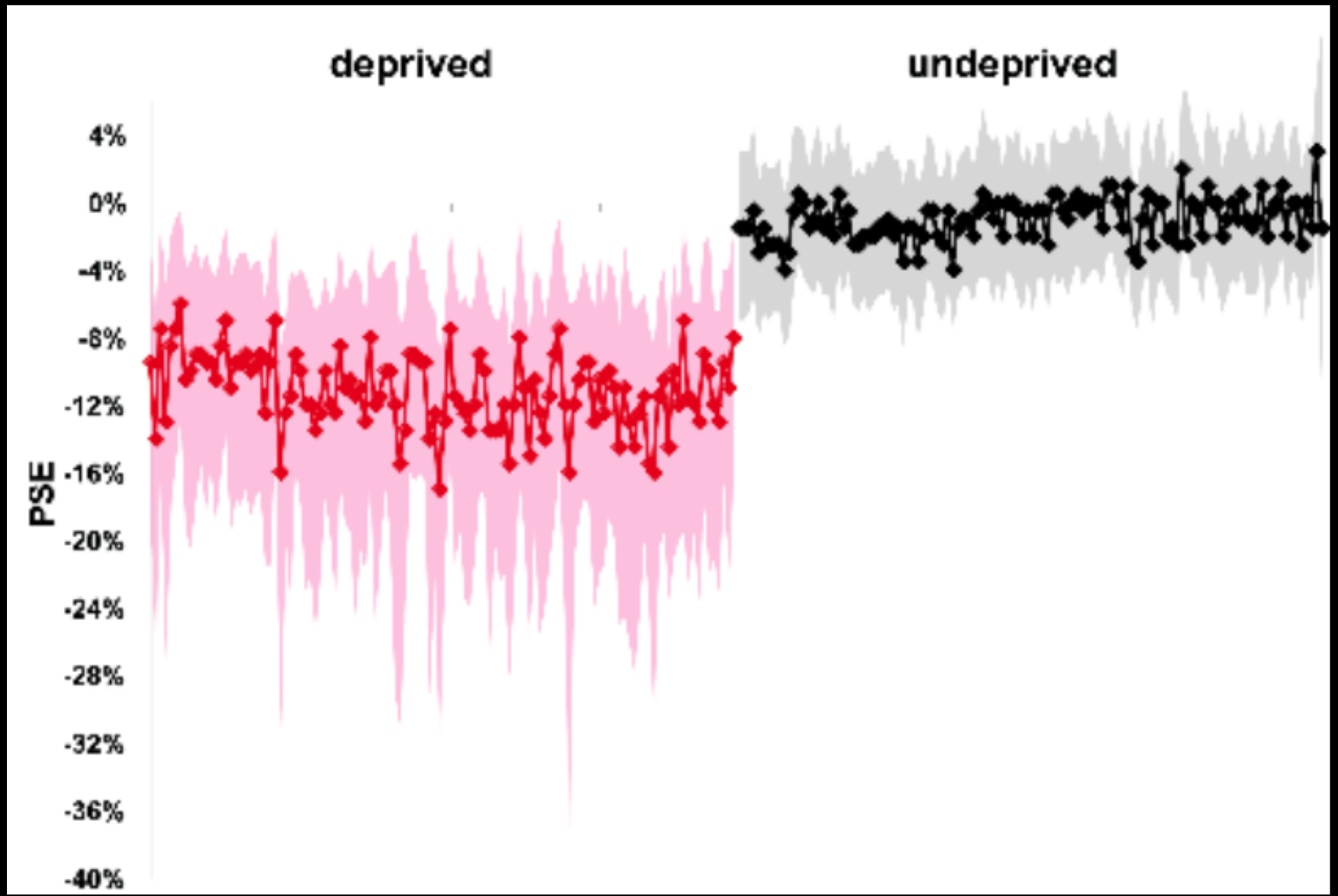


Dilks et al., *J. Neurosci.* (in press)

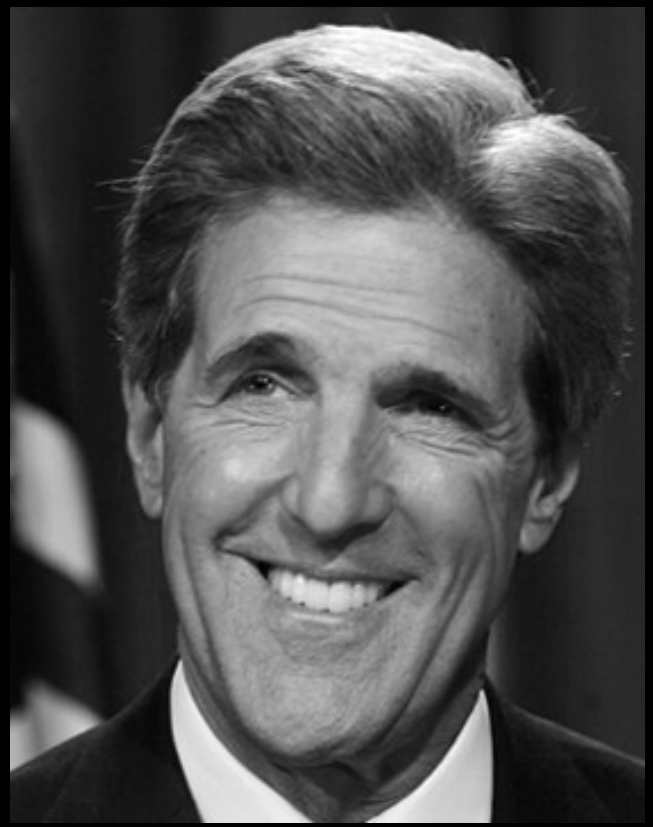
Dilks et al., *J. Neurosci.* (2

to manipulate your vision

visual system can change
– easily
– rapidly

can we force it to change?
to misrepresent the world?

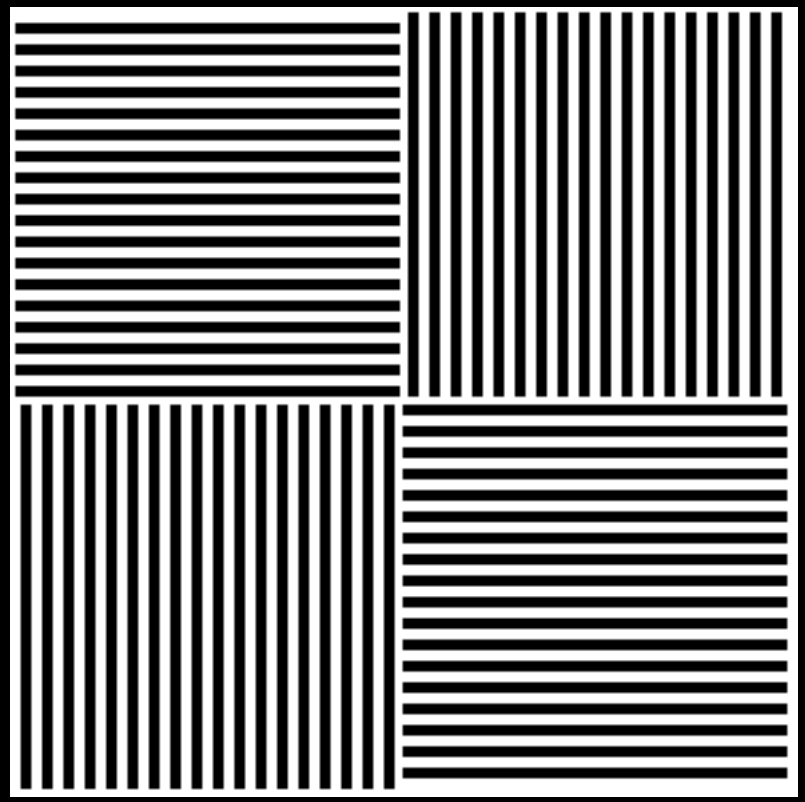
face aftereffect



everything depends on the viewpoint

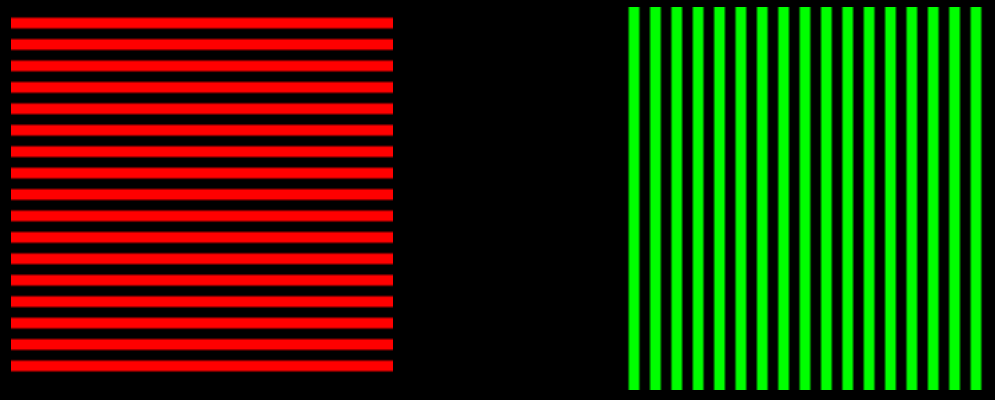
from N. Kanwisher

mccullough effect



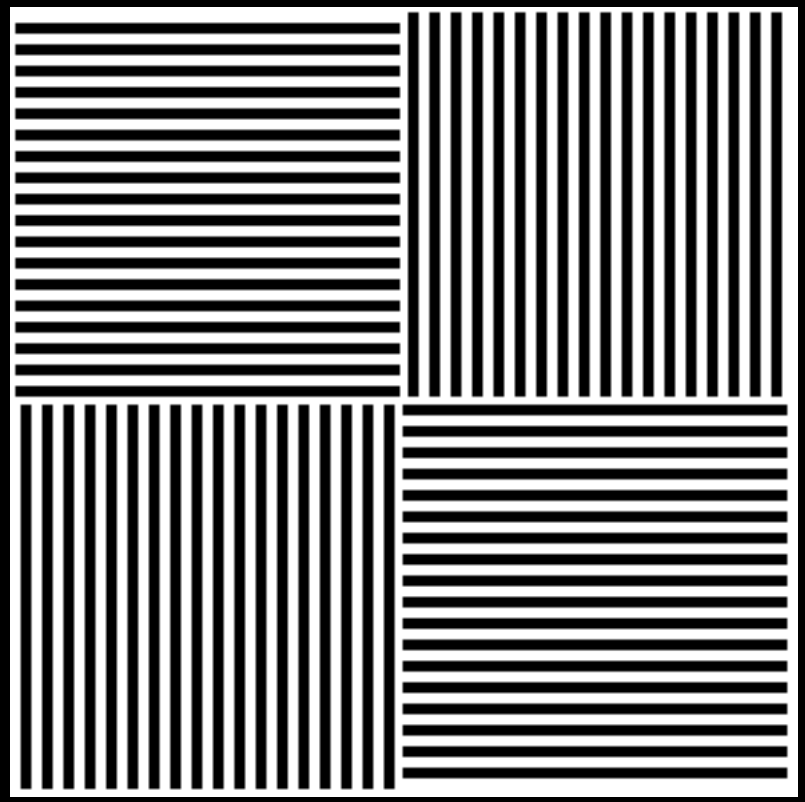
Wikipedia

mccullough effect



Wikipedia

mccullough effect



Wikipedia

warmth

physical warmth ➡ intrapersonal warmth

Williams & Bargh, *Science* (2008)

emotional effect on visual system

Whitson & Galinsky, *Science* (2008)

framing

Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows:

– If Program A is adopted, 200 people will be saved.

– If Program B is adopted, there is 1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved.

Which of the two programs would you favor?

Kahneman & Tversky, *Science* (1981)

framing

Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows:

– If Program C is adopted 400 people will die.

– If Program D is adopted there is 1/3 probability that nobody will die, and 2/3 probability that 600 people will die.

Which of the two programs would you favor?

Kahneman & Tversky, *Science* (1981)

stereotyping

Marius is a short, slim man. He likes to read poetry. He has been active in environmental and feminist causes. Marius is a:

a a truck driver
b a languages professor
c an engineering major
d a truck driver who is a member of the Lithuanian Writers' Union

But:
a > c > b > d

mod. from J. Wolfe; based on Tversky & Kahneman, *Science* (1974)

fundamental attribution error

Rasa did not submit her homework

– Rasa is a lazy student

You did not submit your homework

– You are a bright student, you simply did not have time last night to work on it.

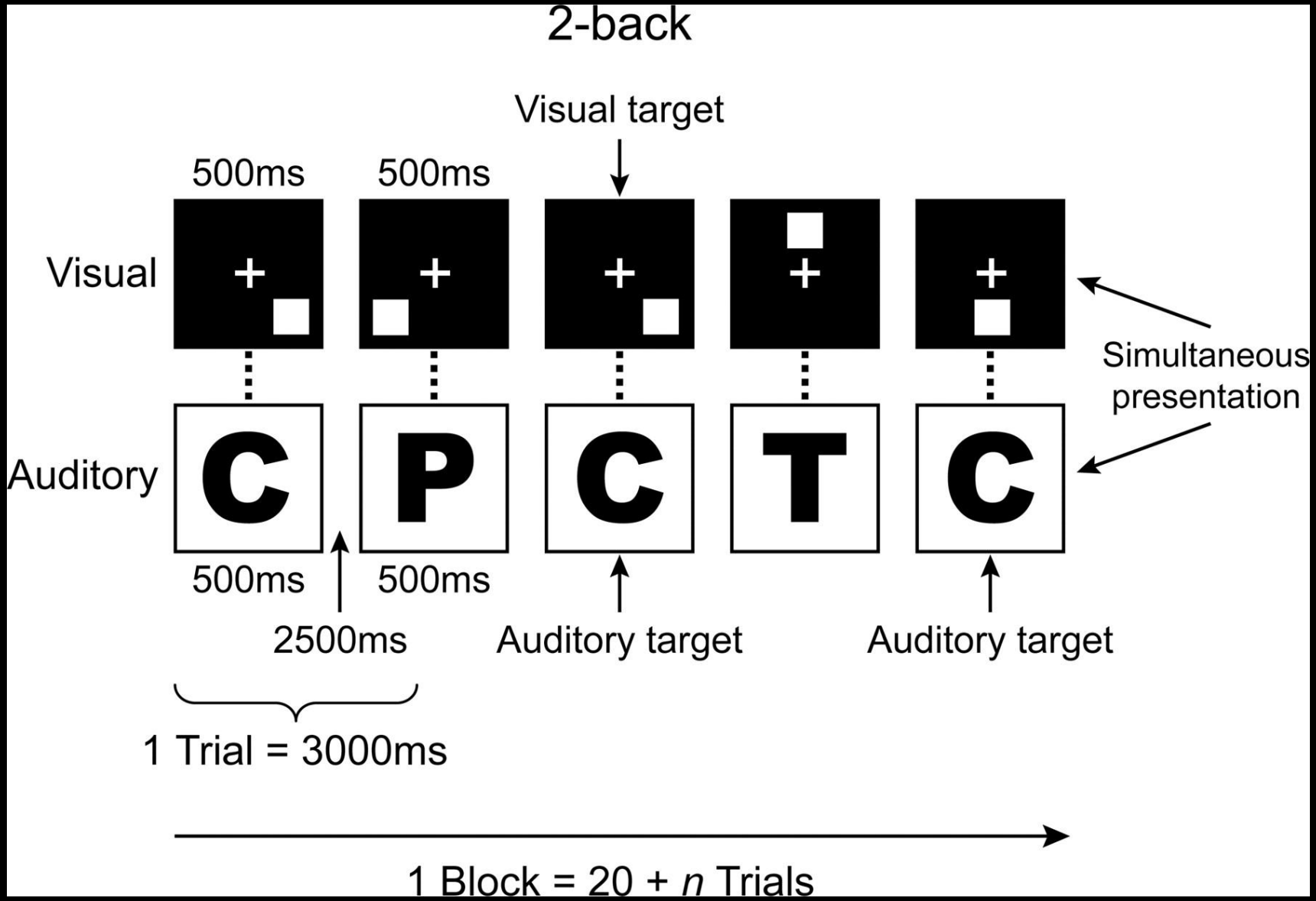
Real life example: comments online

improve yourself

Fluid intelligence (Gf) is the ability to find meaning in confusion and solve new problems. It is the ability to draw inferences and understand the relationships of various concepts, independent of acquired knowledge.

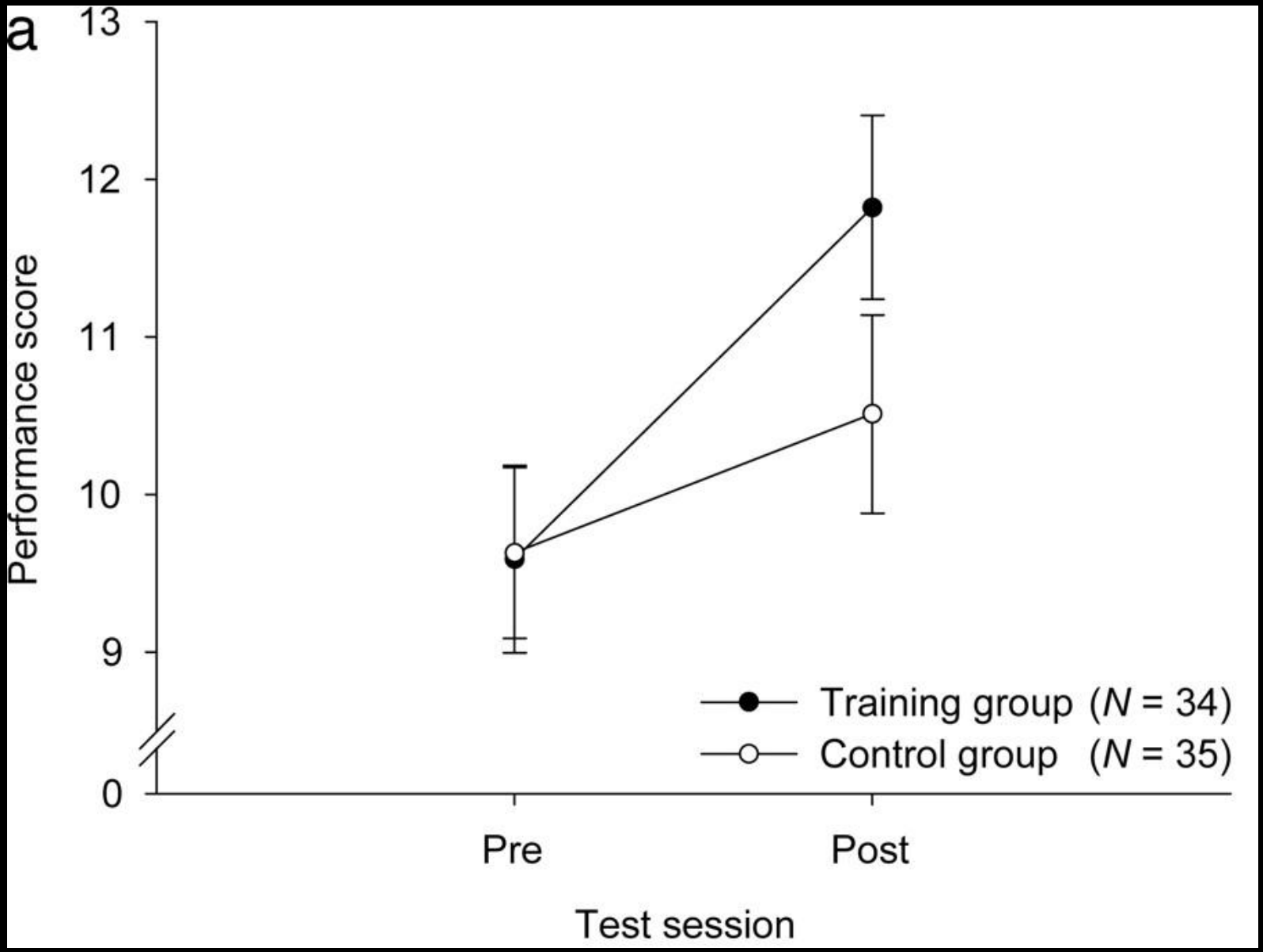
Wikipedia

improve yourself



Jaeggi et al., *PNAS* (2008)

improve yourself



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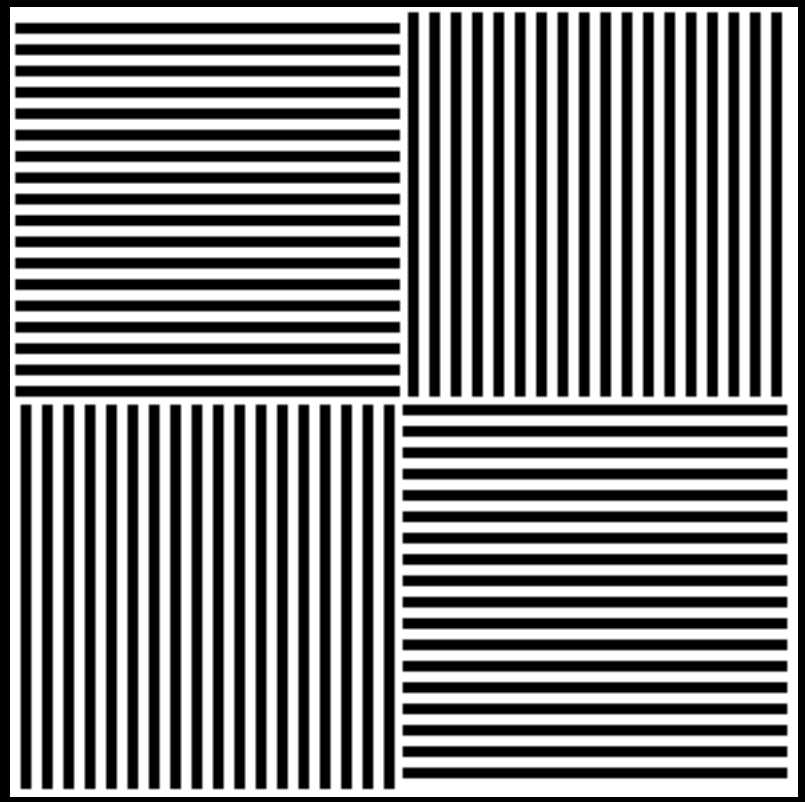
mccullough effect



Wikipedia

lesson to learn

your life is in your hands

thank you

slides available at jonaskubilius.mp | qbilius@alum.mit.edu