Investigating Different Methods to Study Human Brightness Perception

Hafidz Arifin

Agenda

1. Basics
2. Methods
3. Prior Results
4. Research Question

Basics

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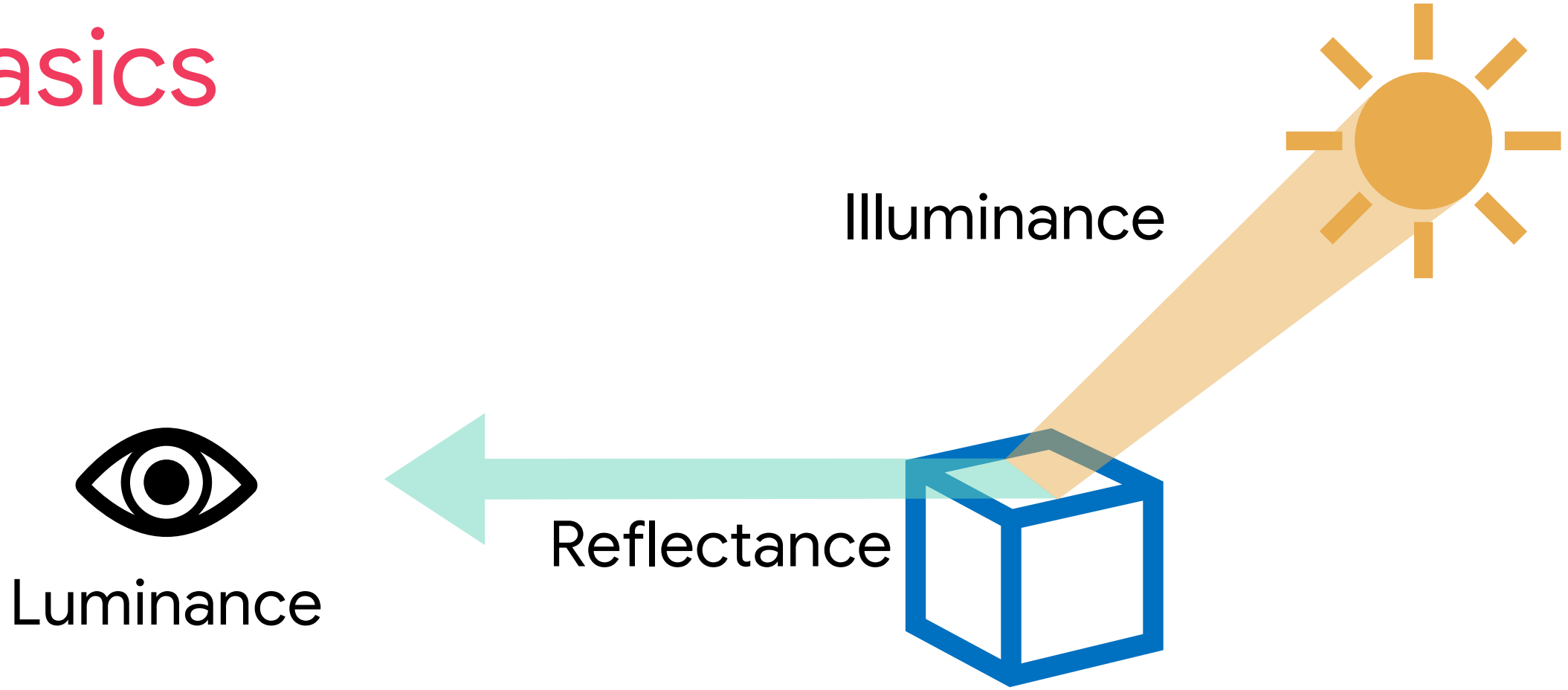
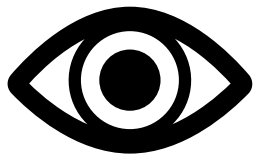
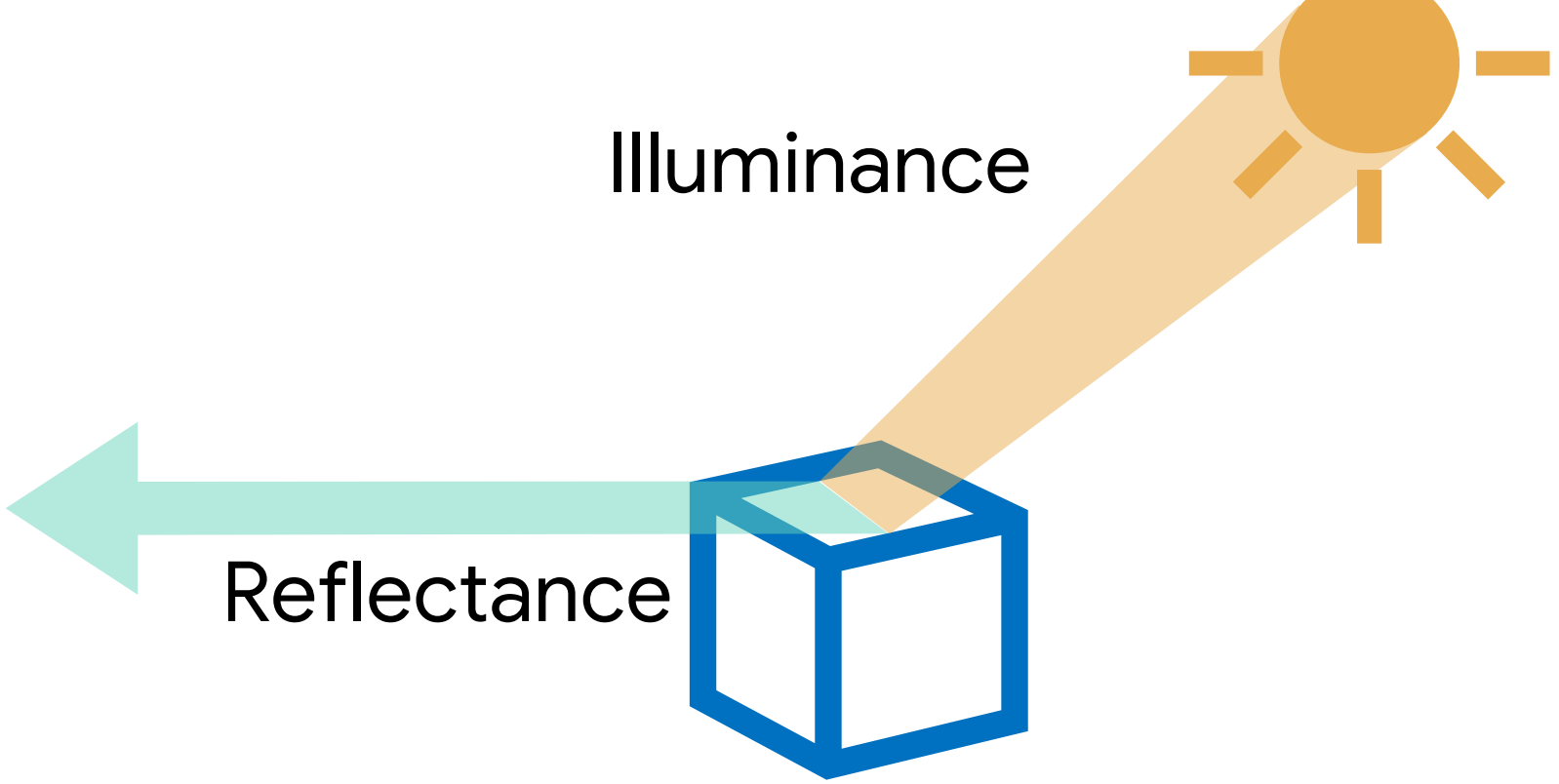
Basics



Basics



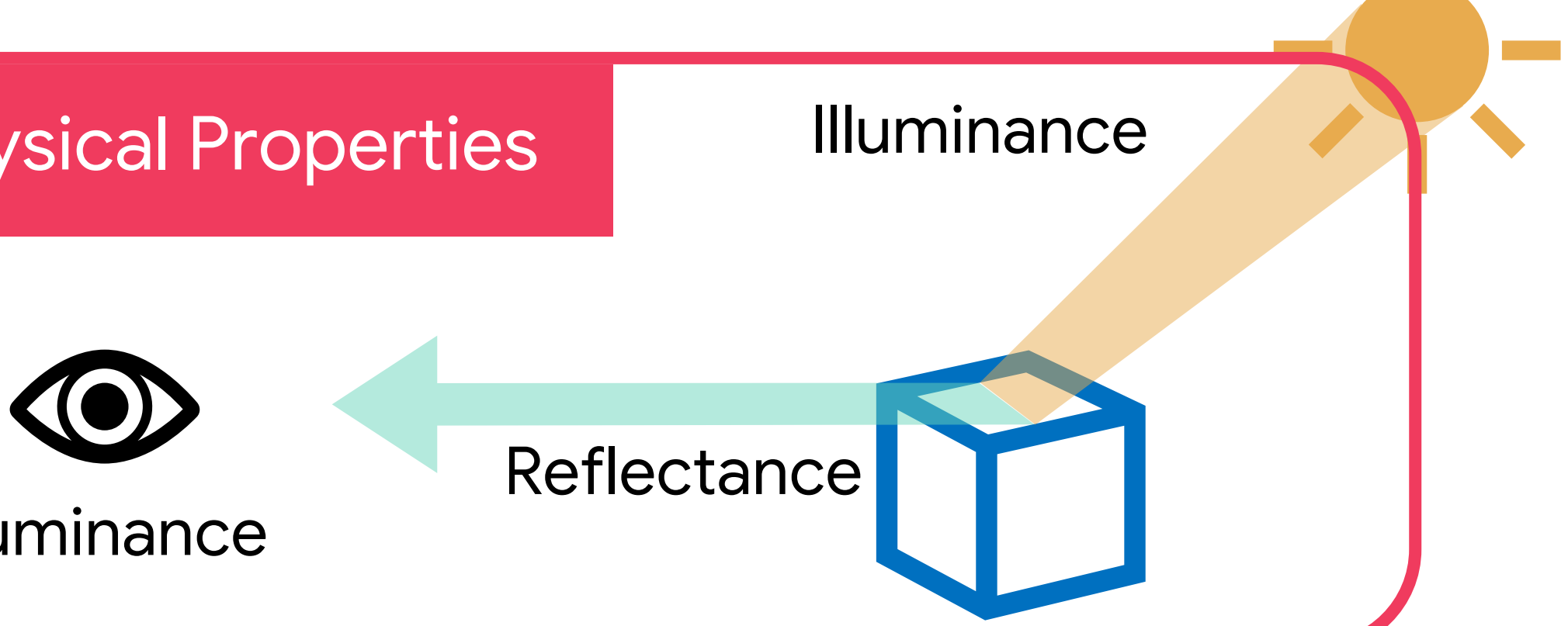
Luminance



Brightness =
Perceived Luminance

Lightness =
Perceived Reflectance

Physical Properties

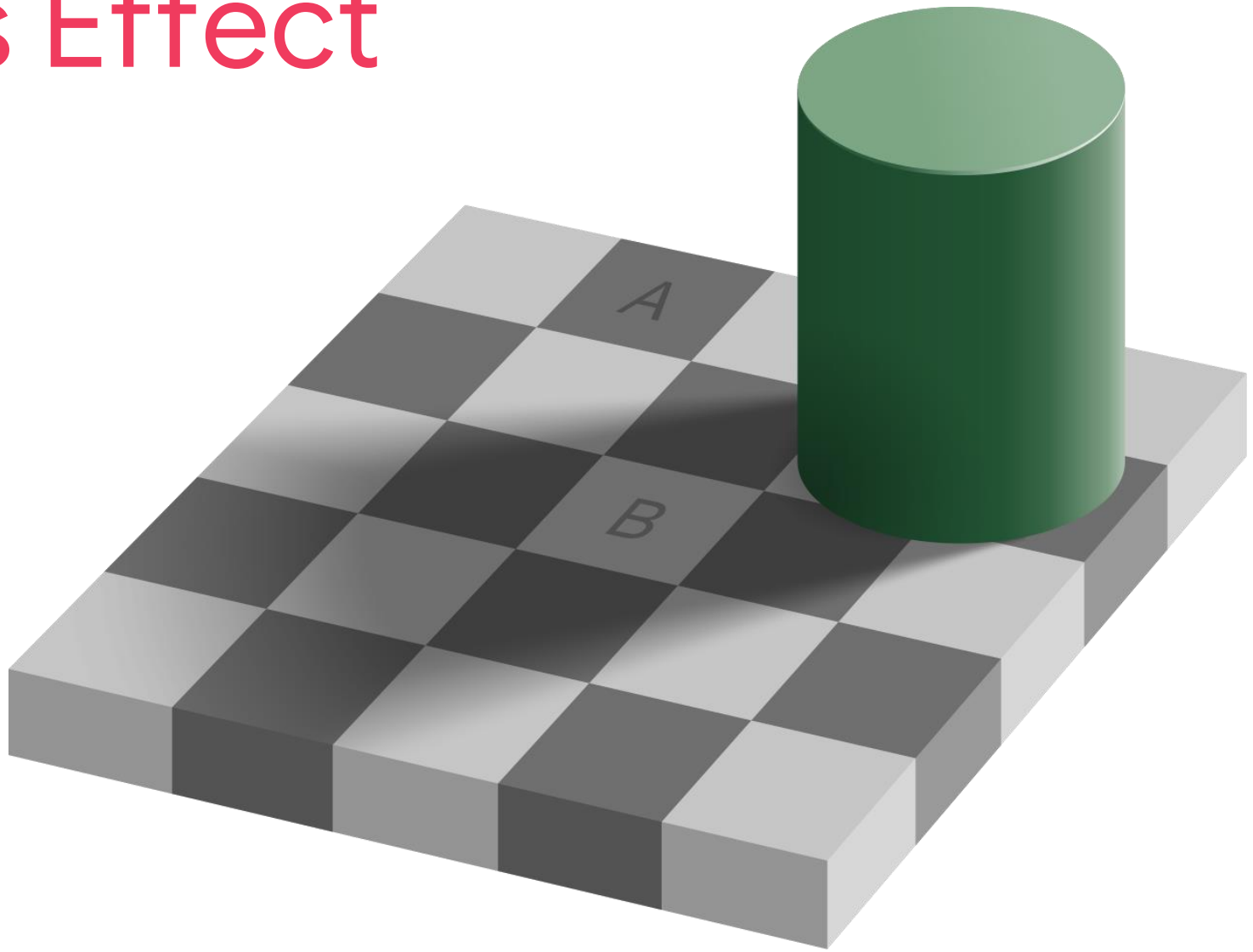


Subjective Variables

Brightness =
Perceived Luminance

Lightness =
Perceived Reflectance

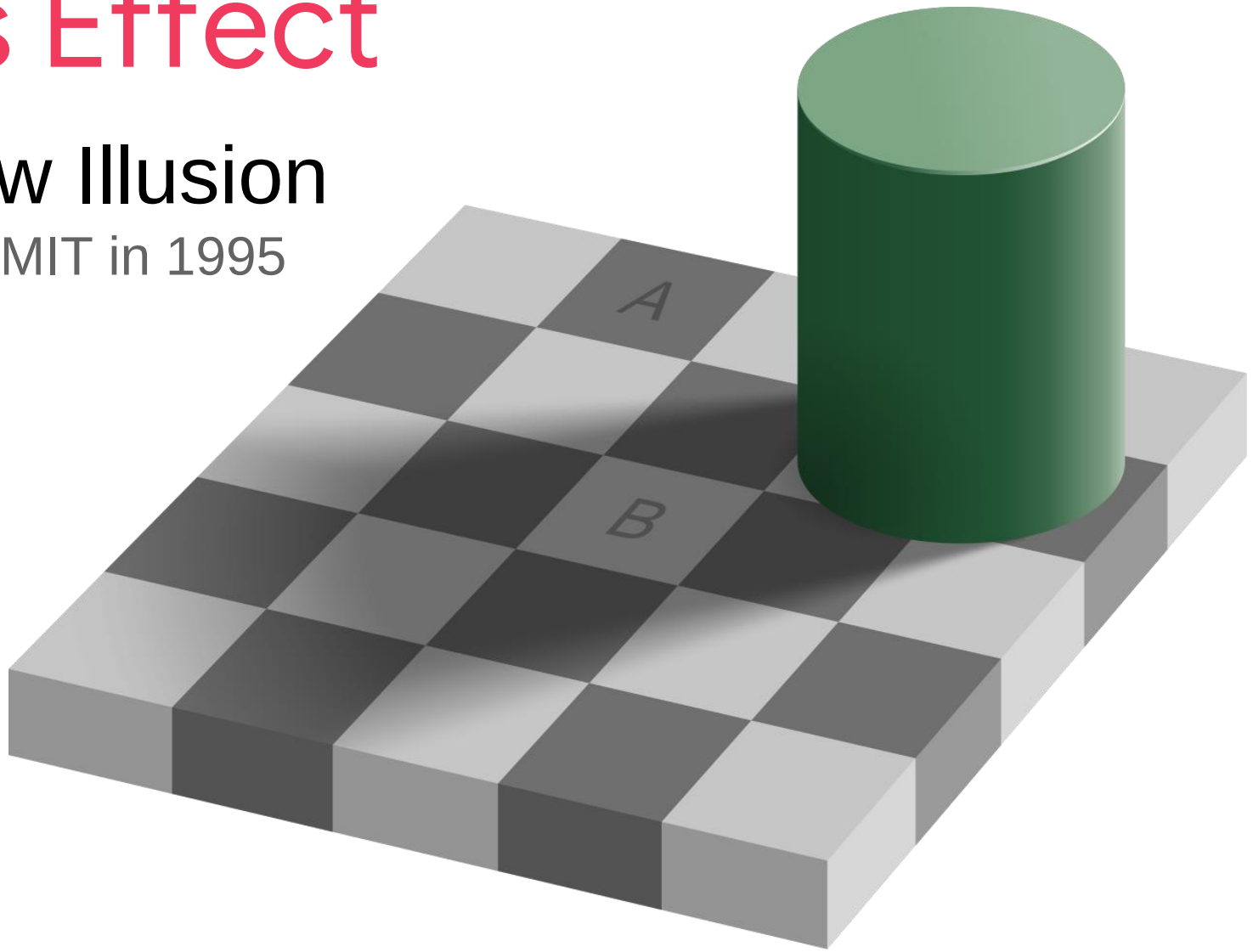
Brightness Effect

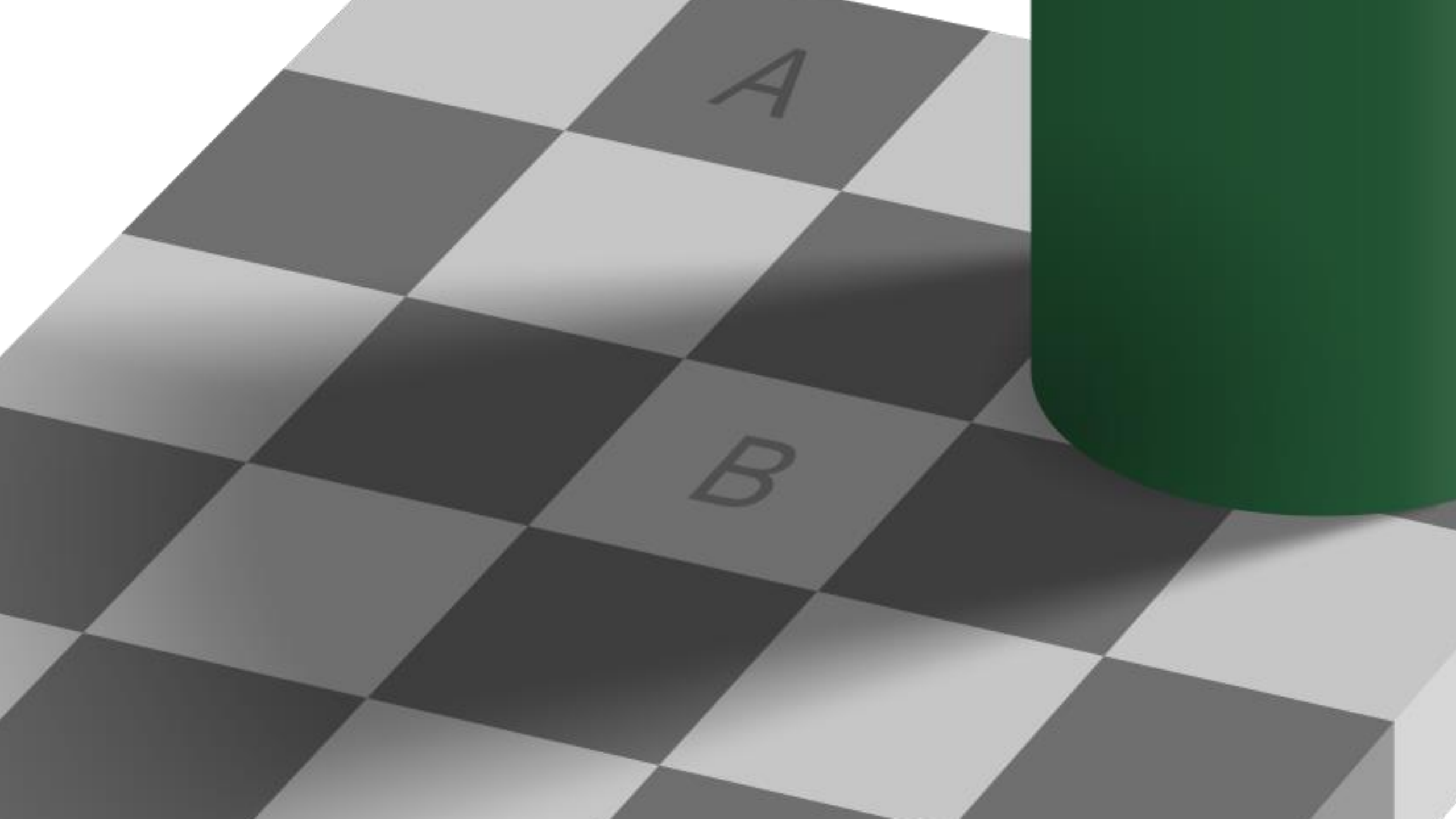


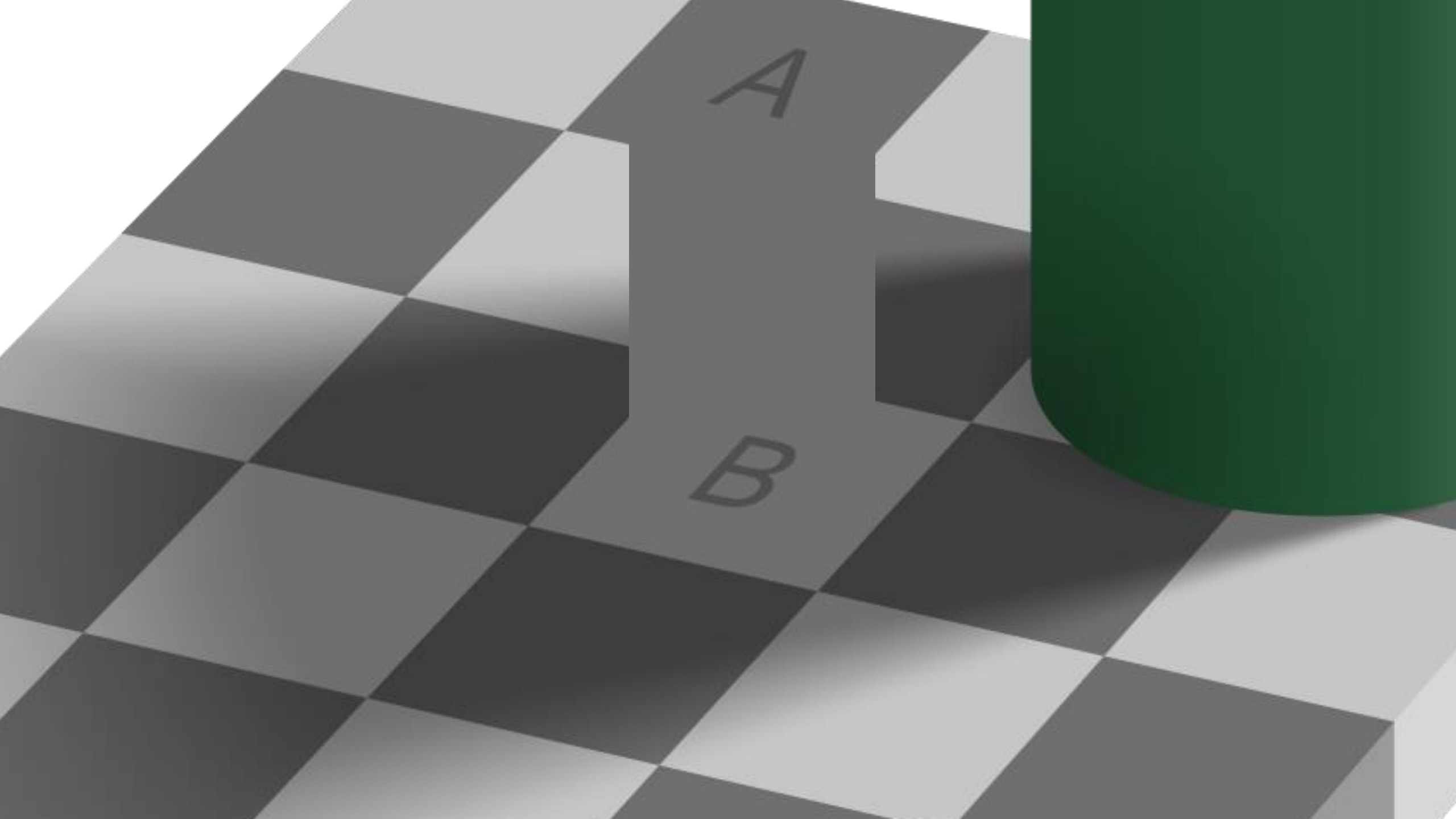
Brightness Effect

Checker Shadow Illusion

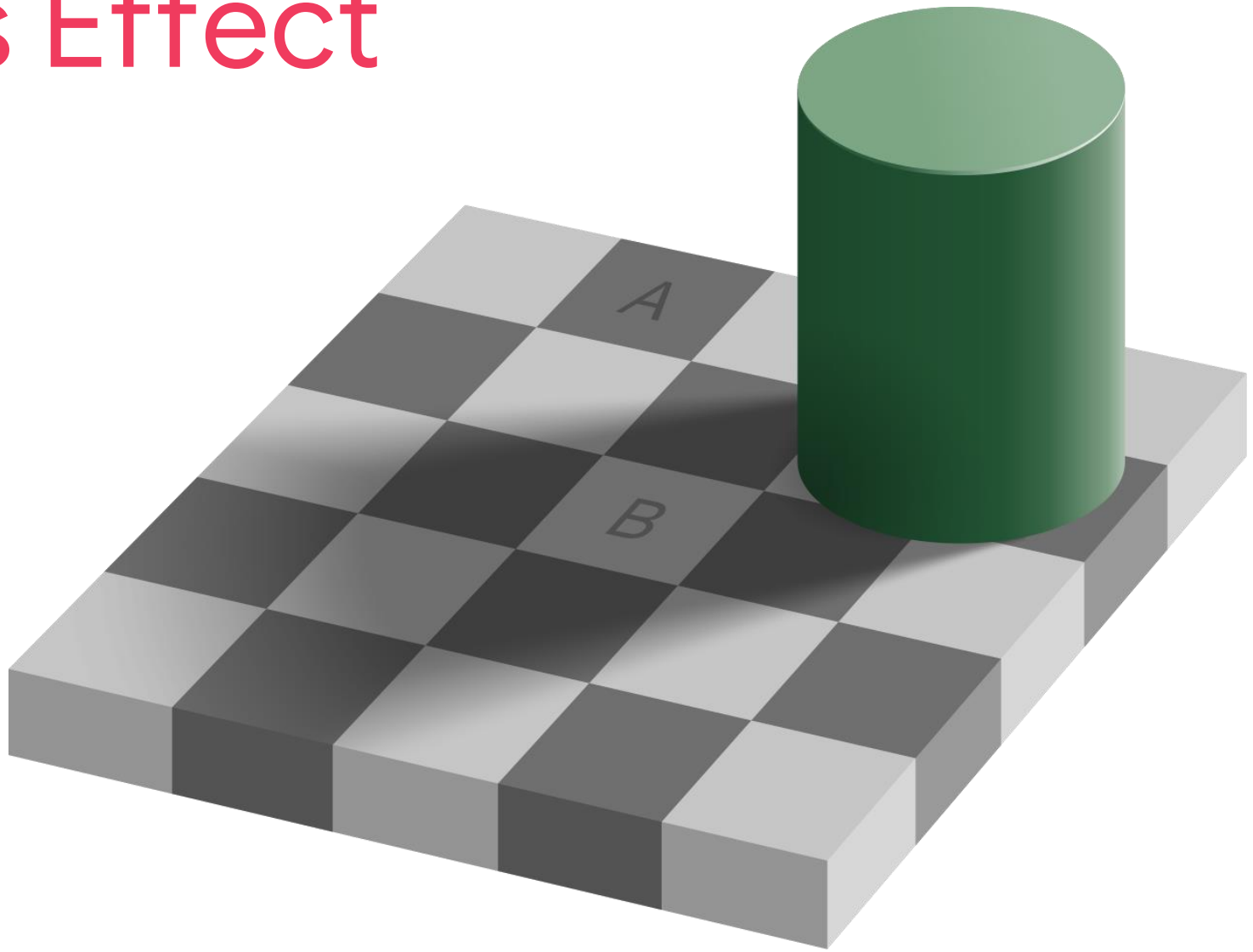
by Edward H. Adelson, MIT in 1995




A
B

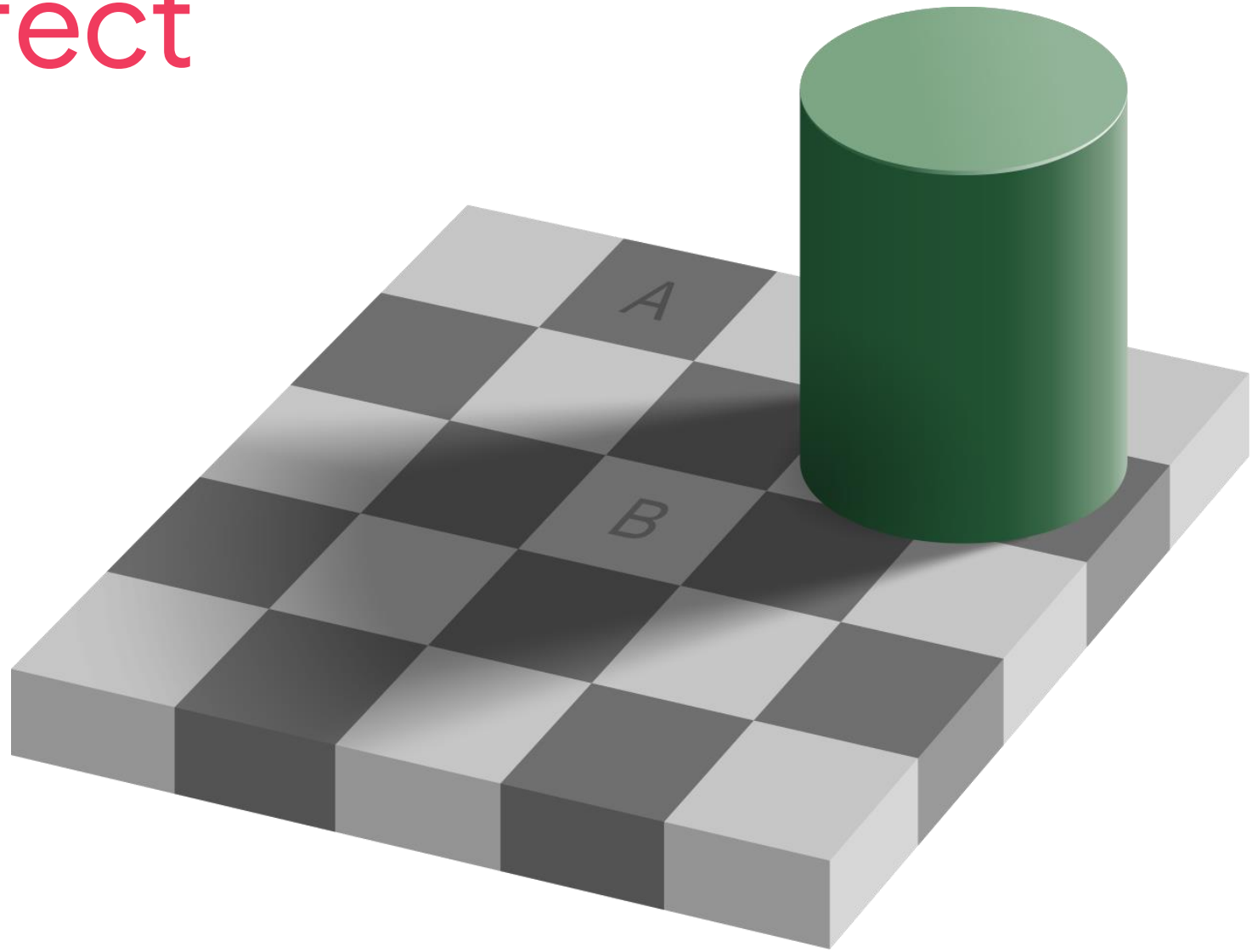

A
B

Brightness Effect

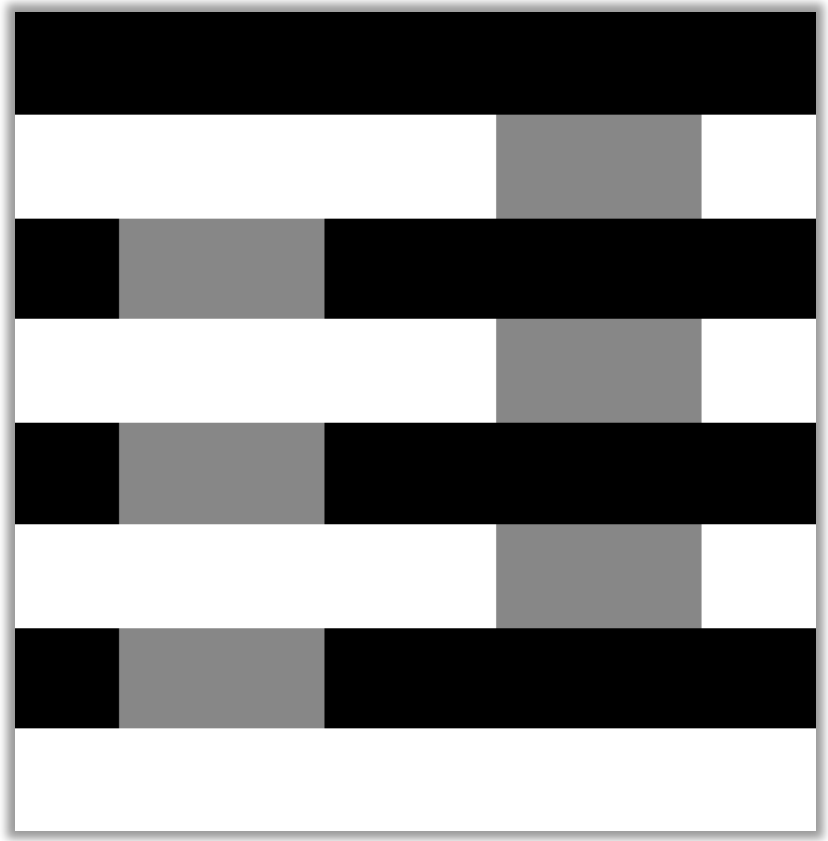


Brightness Effect

Same Luminance
Different Brightness



Stimuli



Consists of

2 equiluminant gray regions (“targets”)

Methods

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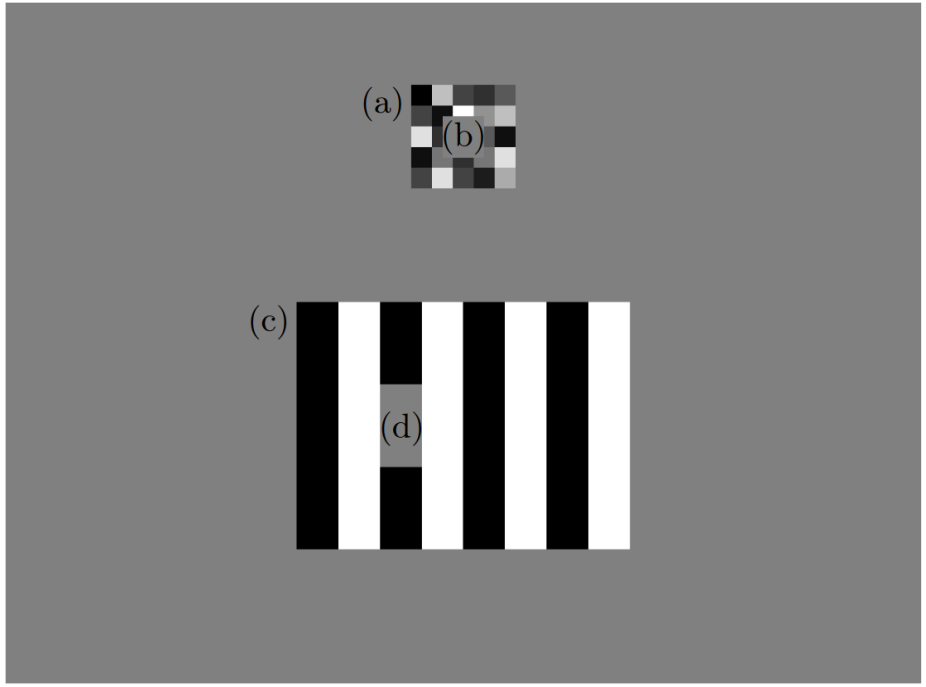
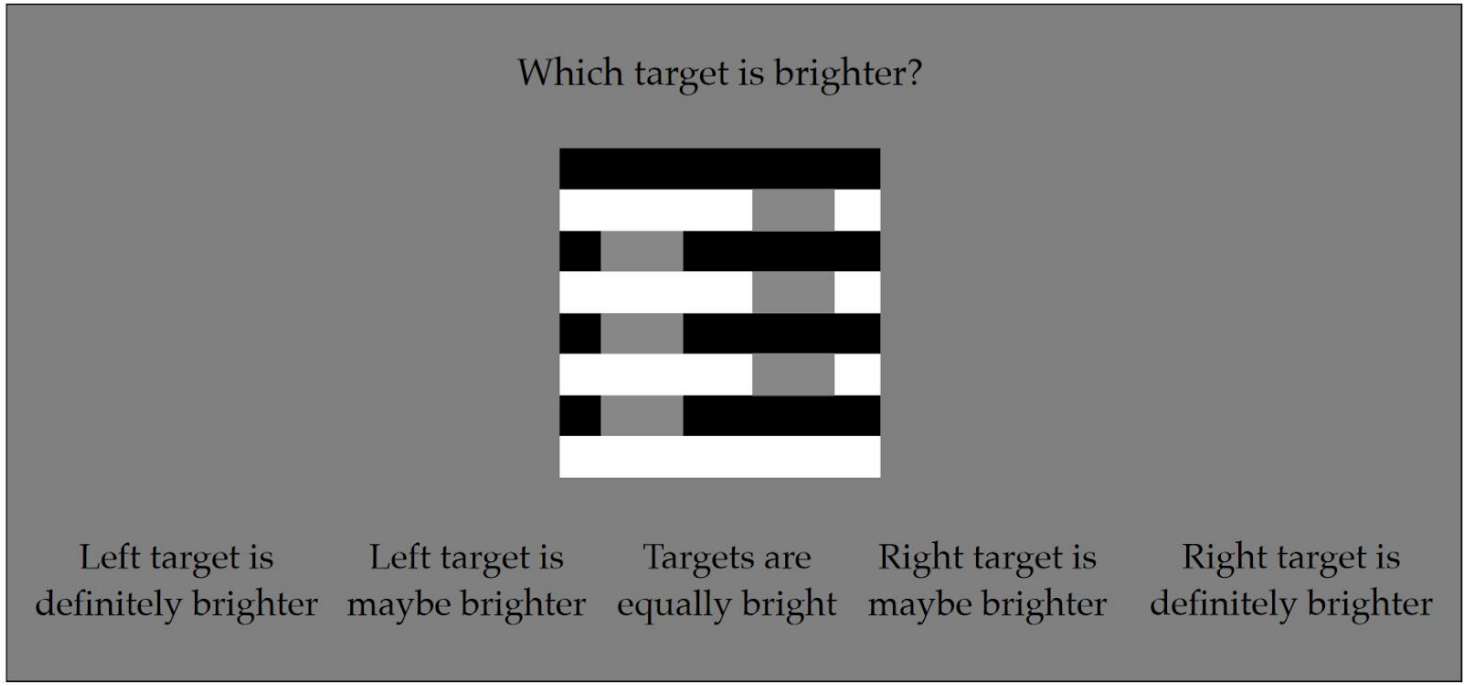
Methods

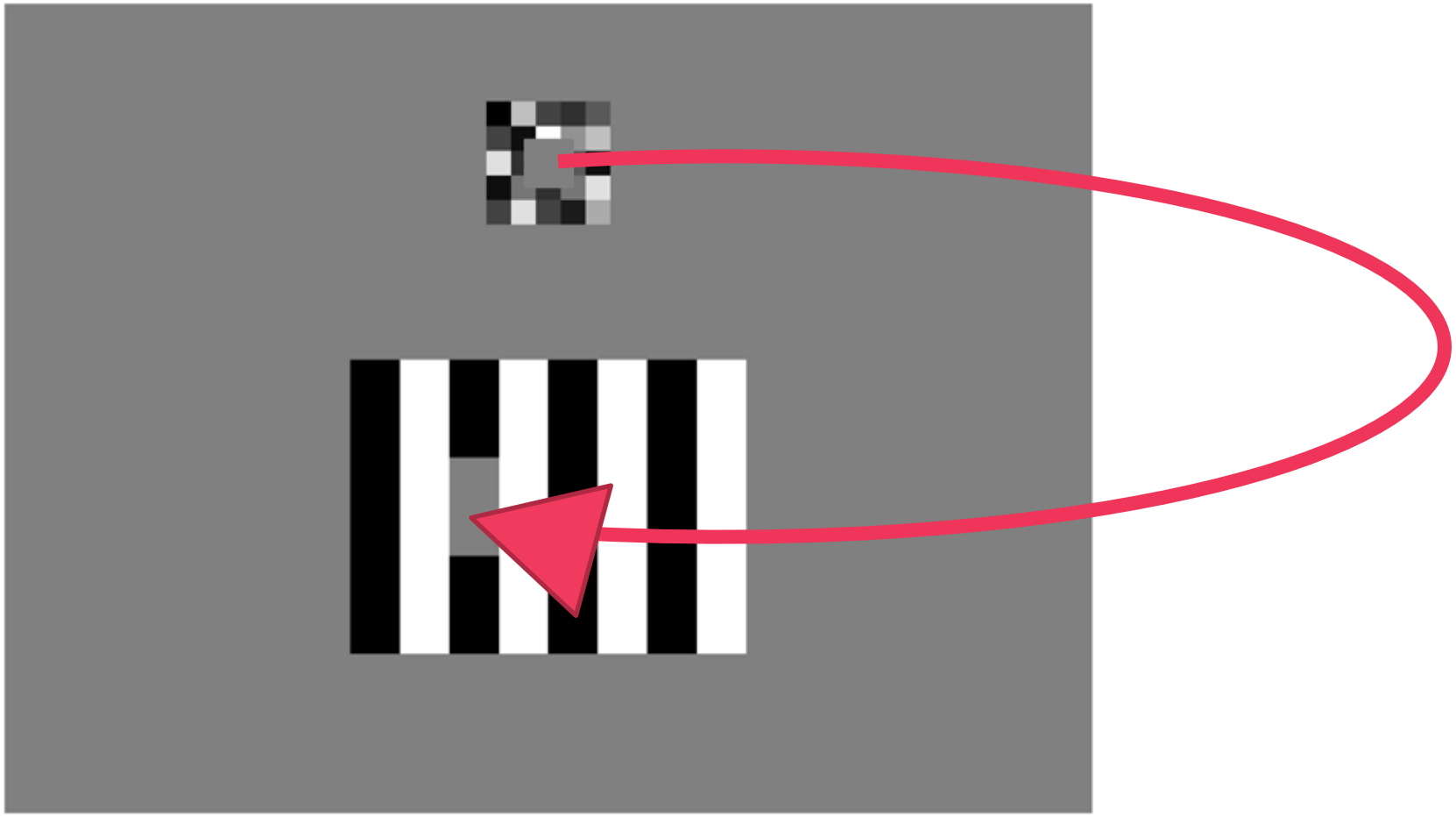
Method of Adjustment



Brightness Rating

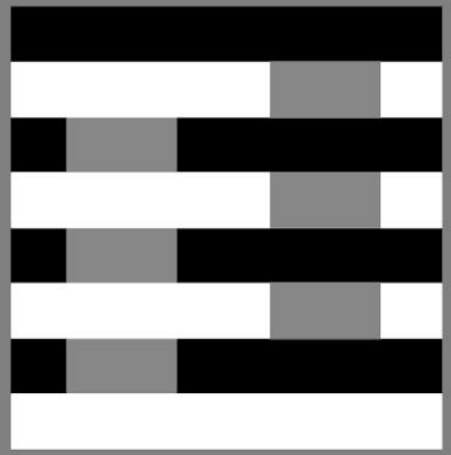


Method of Adjustment



Brightness Rating

Which target is brighter?



Left target is definitely brighter	Left target is maybe brighter	Targets are equally bright	Right target is maybe brighter	Right target is definitely brighter

Prior Work & Results

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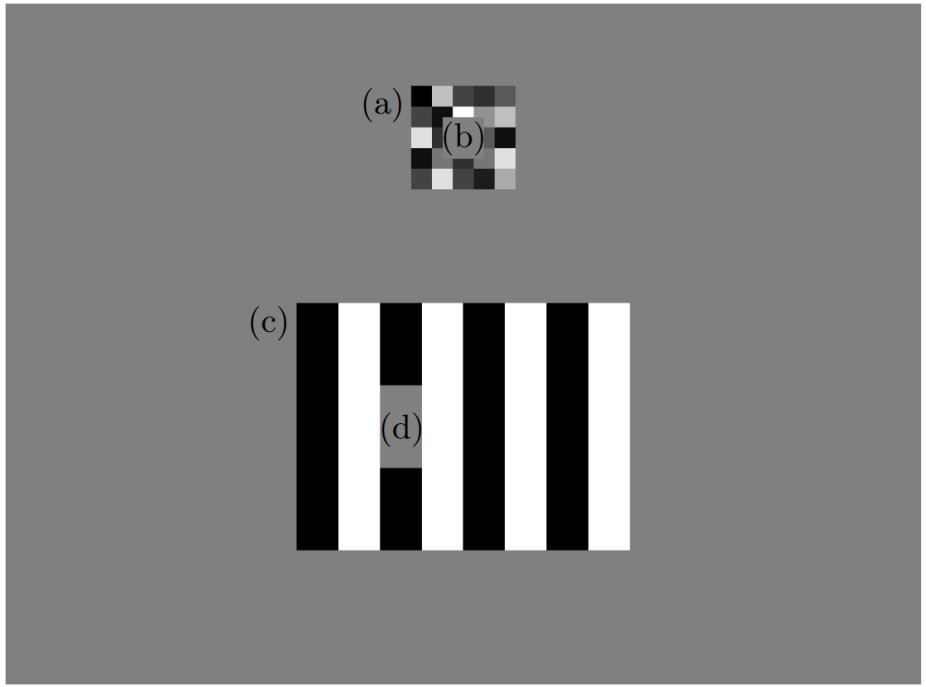
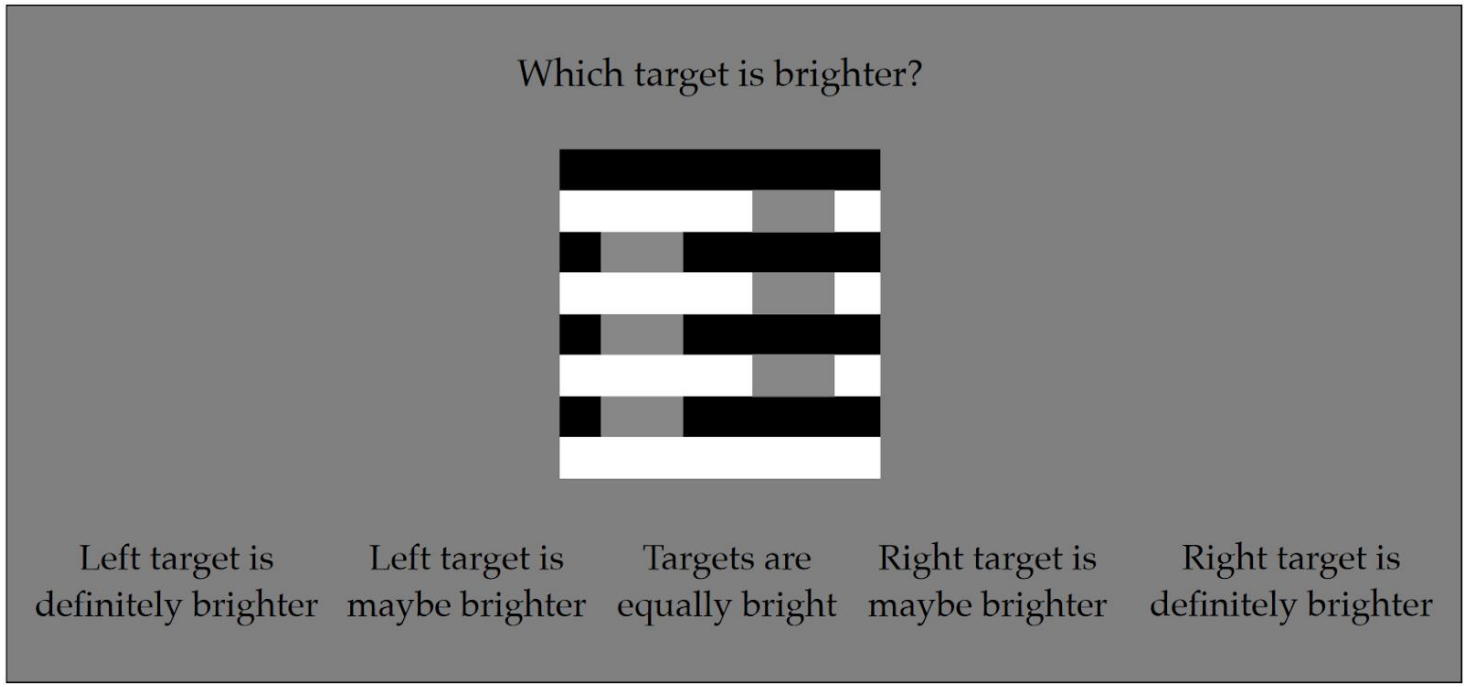
Method of Adjustment



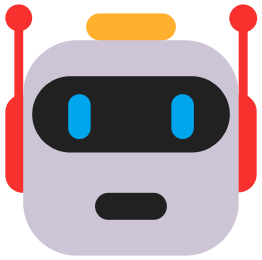
Marcus Bindermann

Brightness Rating

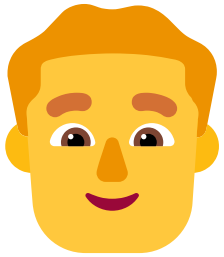


Anas Allaham

Vergleich ausgewählter Helligkeitsphänomene:
Modellbasierte Vorhersagen
und **psychophysische Messungen**



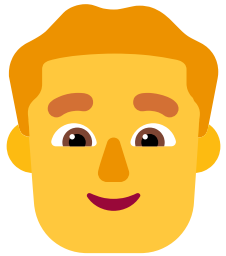
Compare Results

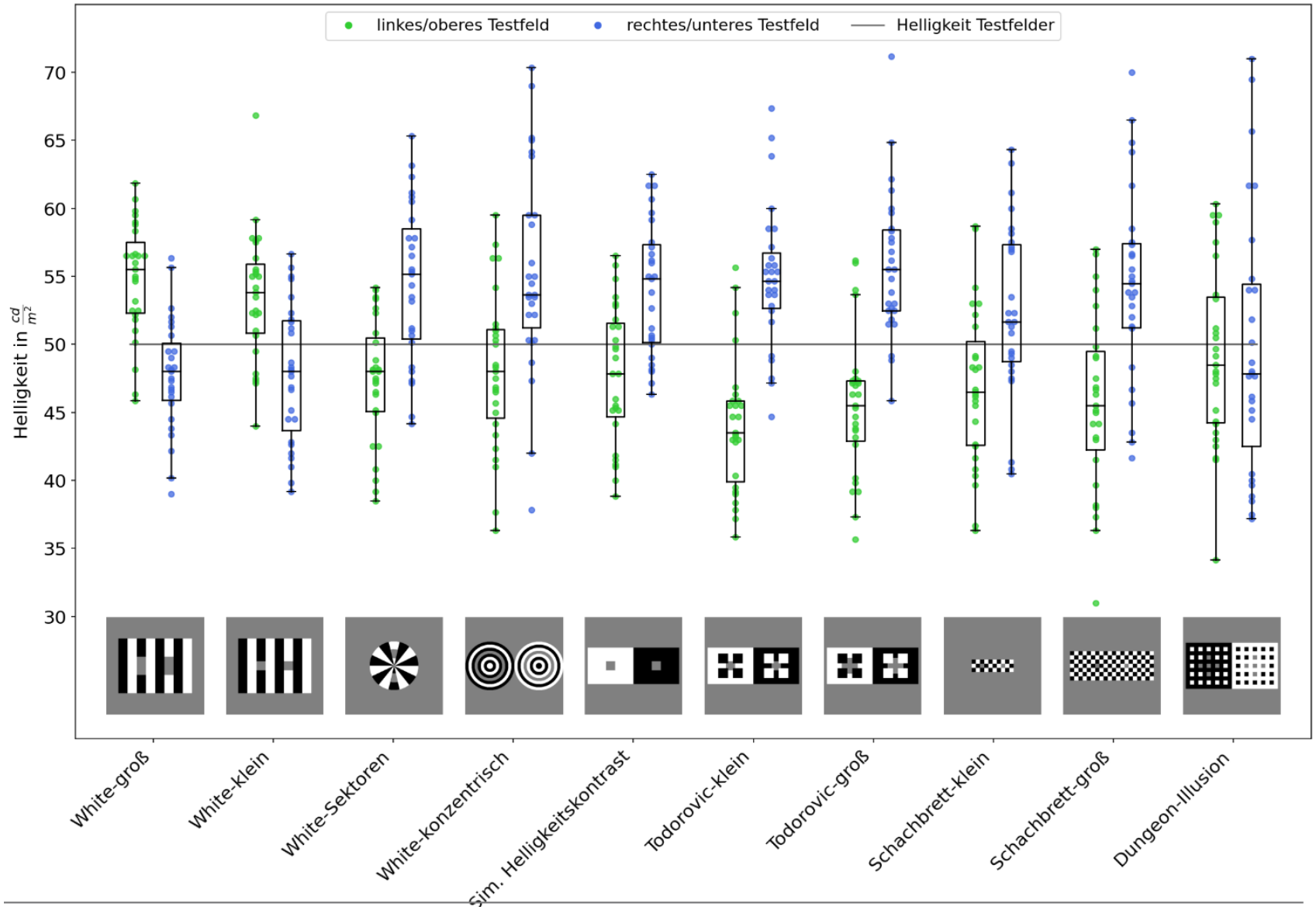


ODOG-Model

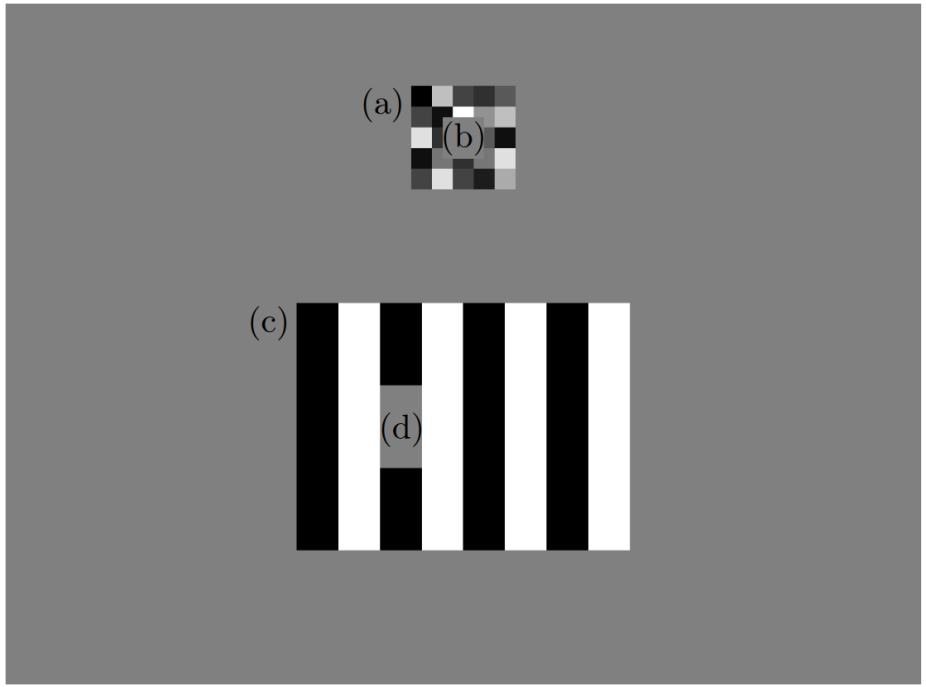
27 Participants

Marcus Bindermann



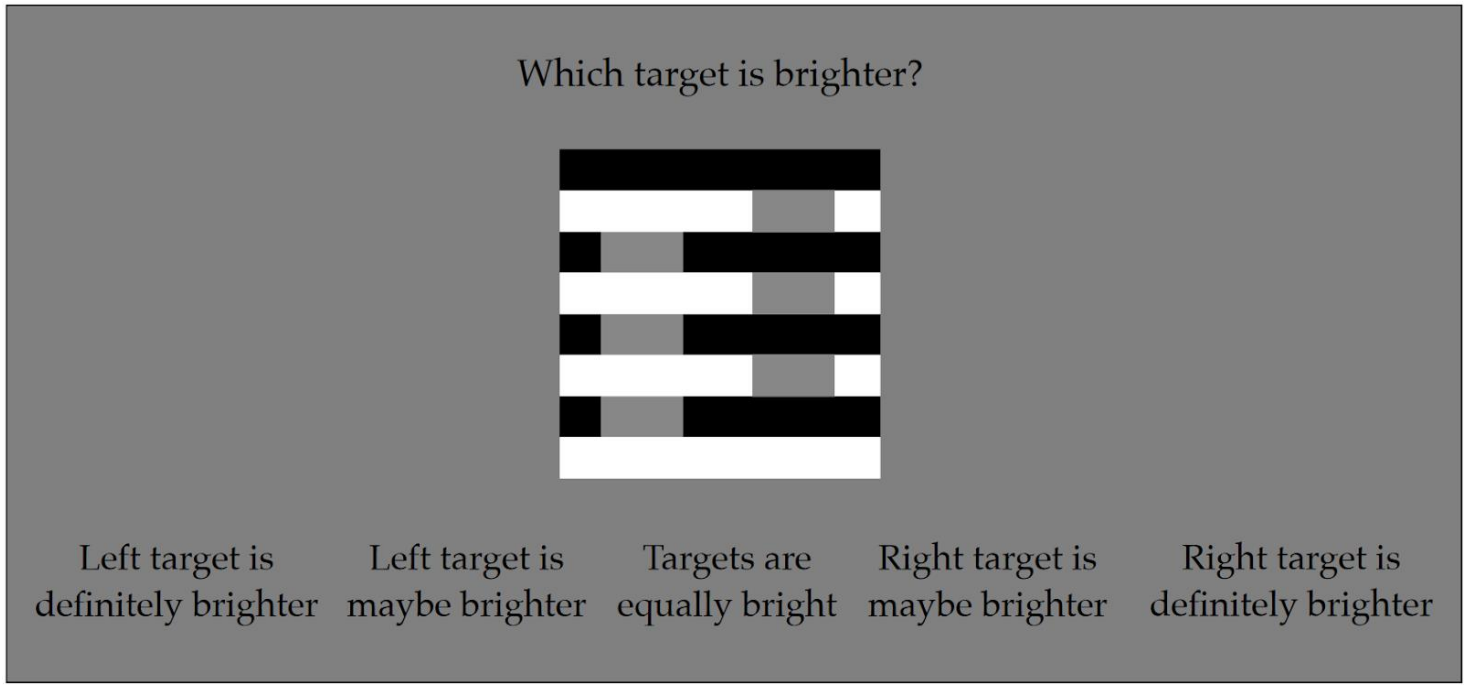


Method of Adjustment



Marcus Bindermann

Brightness Rating



Anas Allaham

Anas Allaham

Investigating Inter-Individual Differences in Human Brightness Perception

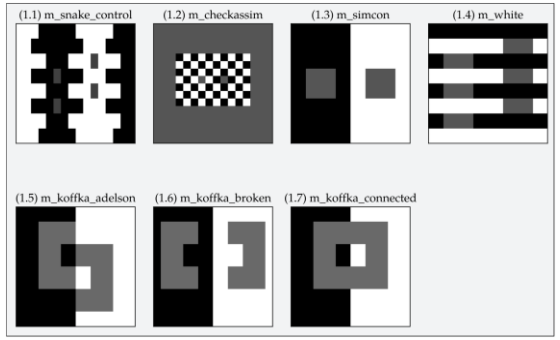
Variable

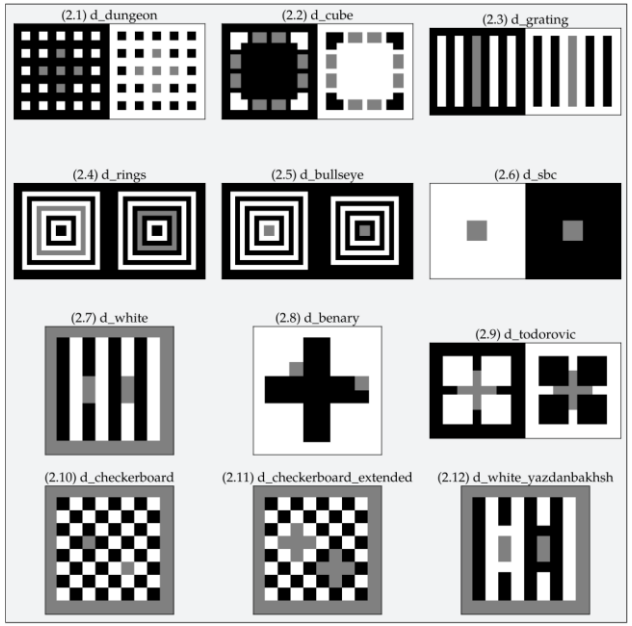
Average

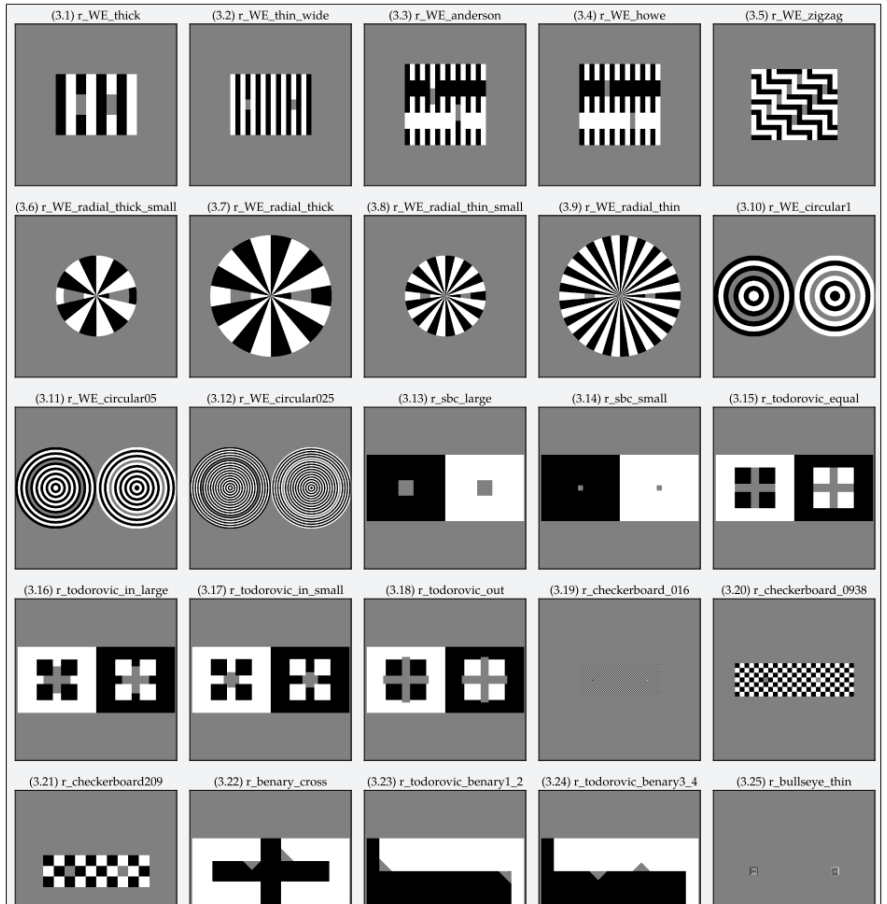
Agree

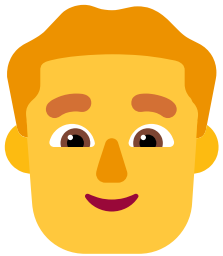
Anas Allaham

Investigating Inter-Individual Differences in Human Brightness Perception



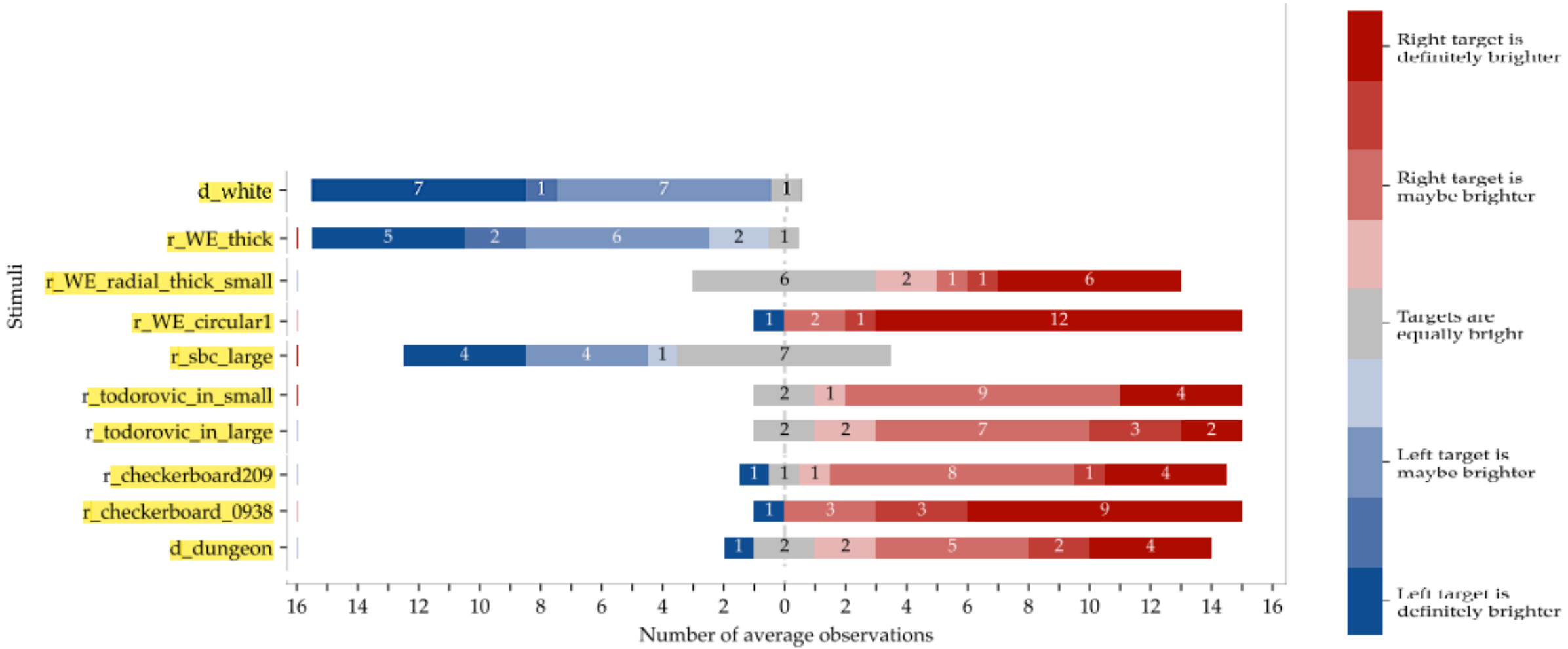






16 Participants

Anas Allaham



	Bindermann	Allaham
Number of stimuli	10	45
Avg. Duration of a run	45 min	17 min
	Time costly	Time efficiently
Judgements	Absolute	Relative
Measurement	Pearson's contingency coefficient	Krippendorff's alpha

Stimulus from Bindermann Which target was used as a reference when the adjustment results were brighter on average?		Stimulus from Allaham Which target is perceived brighter by the participants on average?		Comments to obvious differences in the stimuli
	Left	Left		Stimulus from Allaham is stretched vertically.
	bottom	right		One stimulus rotated at 90 degrees.
	Almost both (right was slightly brighter)	right		The Sizes of both stimuli are different.
	right	left		One stimulus is flipped horizontally.

- Different Experiments
- Different Participants
- Different Apparatus
- Different Photometric
- Different Stimuli
  - Luminance
  - Size
  - Type

Research Question

4/4

Research Question

Do data collected
with two different methods
- method of adjustment and brightness ratings -
give similar estimates
for the perceived brightness
in different brightness illusions? ?

Thank You :D

Reference

Mohamad Anas Allaham (2022). Investigating Inter-Individual Differences in Human Brightness Perception

Marcus Bindermann (2022). Vergleich ausgewählter Helligkeitsphänomene: Modellbasierte Vorhersagen und psychophysische Messungen

Hurvich, L., and Jameson, D. (1966). The perception of brightness and darkness. Allyn and Bacon.

Adelson, E. H. (1995). Checkershadow illusion. Retrieved from http://persci.mit.edu/gallery/checkershadow

Adelson, E. H. (2000). Lightness perception and lightness illusions. In M. Gazzaniga (Ed.), The new cognitive neurosciences (2nd ed., pp. 339–351). Cambridge, MA: MIT Press.

Questions?