

Experiment on human awareness to images of snakes compared to other animals

Group:

LESÉNÉCHAL
Adrien

UJCIC
Hana

Motivations

Context:

- Snakes were one of the **earliest predators of primates**
- According to the snake detection hypothesis, the **predatory pressure** of these reptiles on primates may have caused **evolutionarily driven changes** in the primate **visual system**

Research question: Are humans more aware to images of snakes compared to other animals?

Task: Discrimination

Visual function: Contrast

Expectation: Humans are **more sensitive to snakes** because of evolutionary changes in the visual system

Stimuli

Animal image:

12 images per category,
4 categories:

- Threatening (snakes, spiders)
- Unthreatening (birds, butterflies)

Birds



Butterflies



Snakes



Spiders



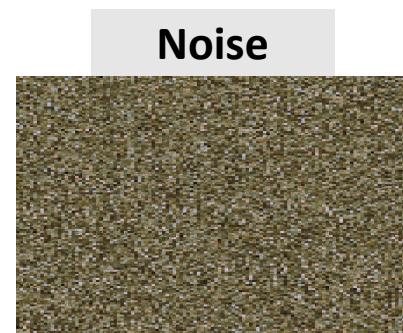
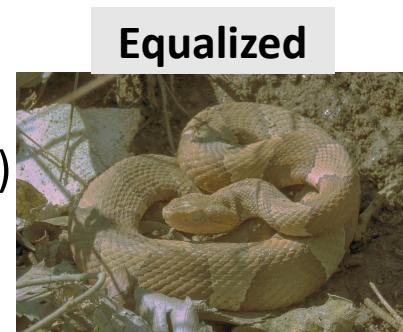
Stimuli

Visualization step (≈ 295 ms):

- 24 / 36 / 48 / 60 ms with resized/equalized image
- 271 / 259 / 247 / 235 ms with mask (backward masking)

Mask:

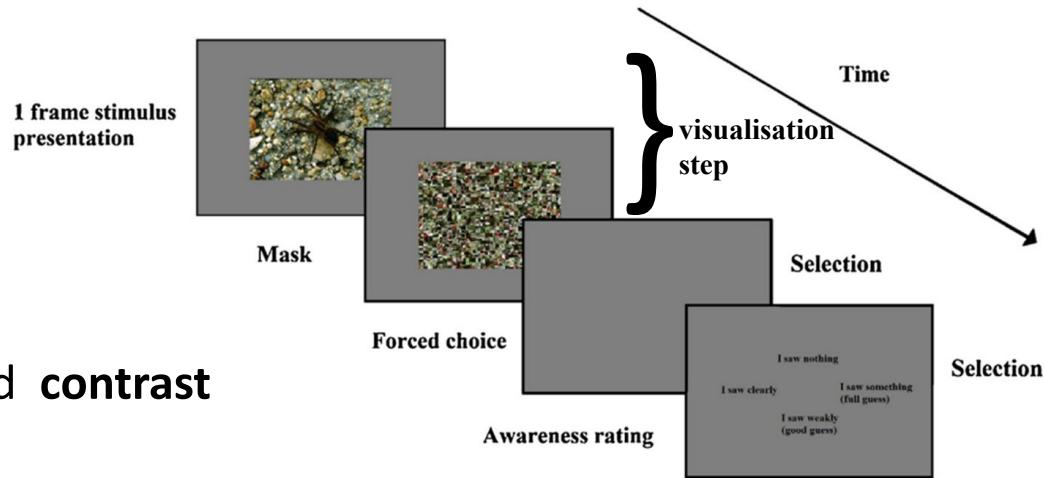
1. Split equalized image into a uniform grid
(find min. tile width and height > 10 px)
2. Shuffle tiles within grid



Methodology & procedure

User task: (for each image)

1. Look at an image of same size, luminance and contrast
2. Select the animal shown on the image
3. Specify the level of awareness (4 choices)

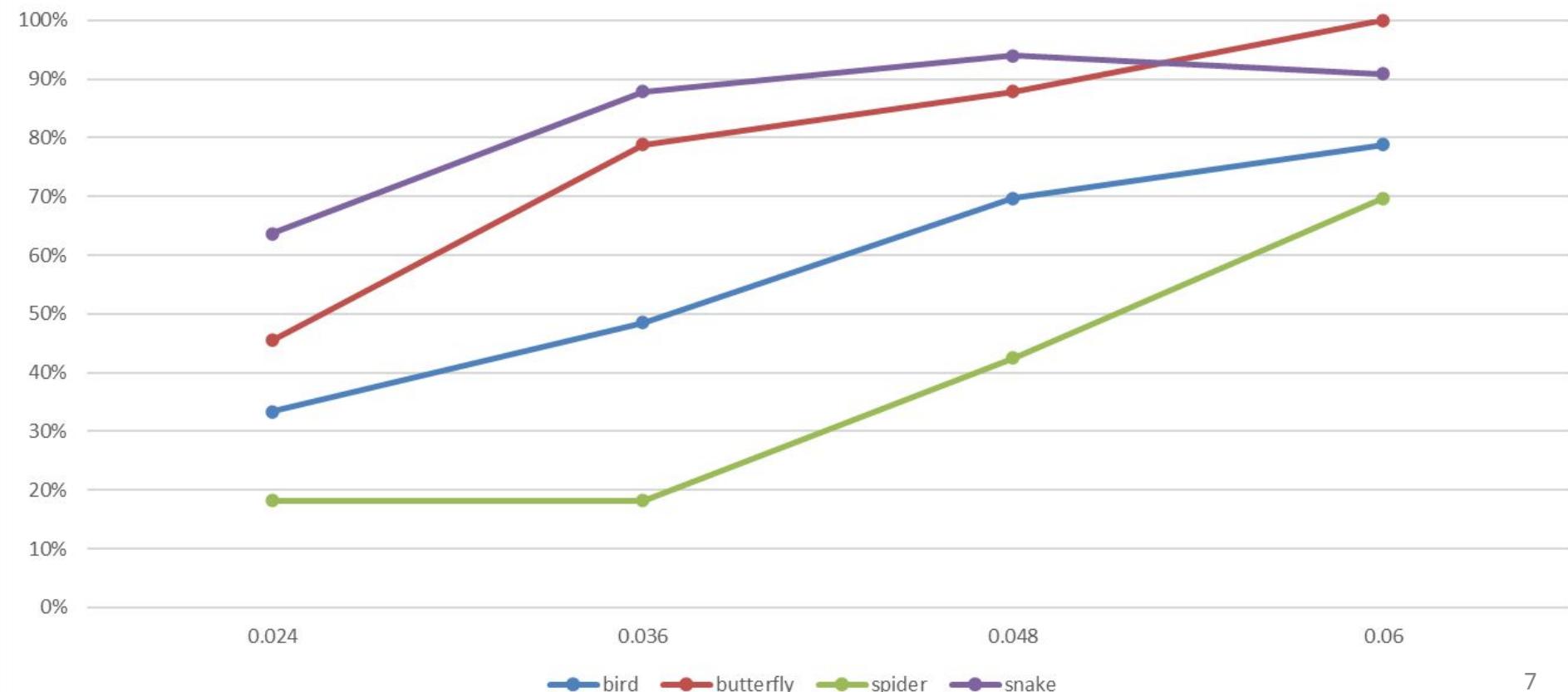


Experiment variables

- **11 participants**
- **Screen** of size 1920×1080 , and of refresh rate 60 Hz
- Each participant was shown **every image** in the test set once, but the **duration** of frame was different for every participant
- Combination of image and duration of frame was **distributed evenly** among participants
- Images and durations of frame were **randomly shown**
 - minimize bias

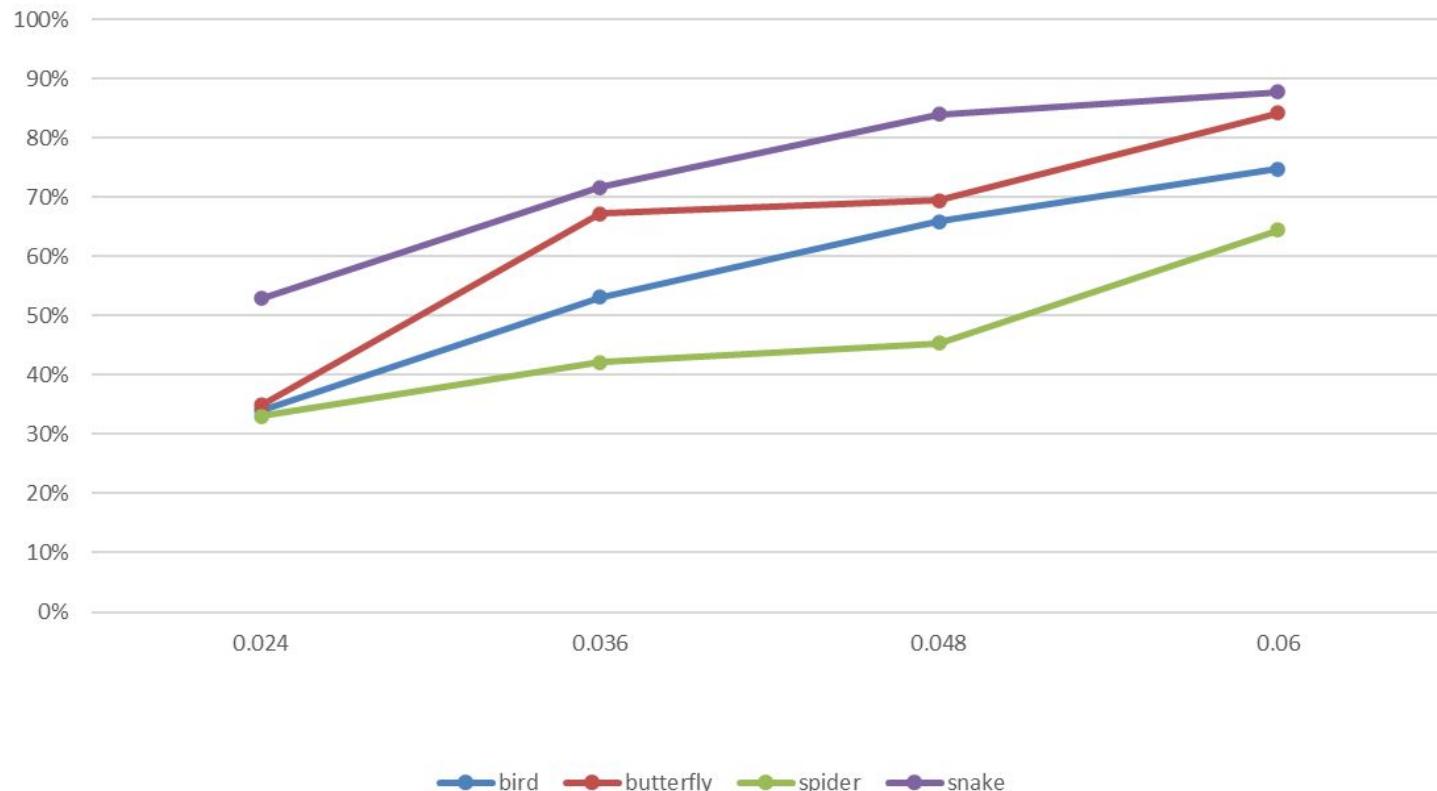
Results

Accuracy for frame rate for every animal



Results

Awareness of stimuli for frame rate for every animal



Results

- Our results were consistent with our expectations: **snakes** were the **most recognized** animal
- **Spiders** were the **least recognized** animals
- **Accuracy increased** with the **duration** of frame
- Participants were **more certain** when the duration of frame was **longer**

Animal	Mean
Bird	0.575
Butterfly	0.78
Spider	0.37
Snake	0.8425

Duration of frame	Mean
0.024	0.4
0.036	0.5825
0.048	0.735
0.06	0.85

Comparison with other studies

S. Grassini, S. Holma, H. Railoa, M. Koivisto,

"Who is afraid of the invisible snake? Subjective visual awareness modulates posterior brain activity for evolutionarily threatening stimuli"

Biological Psychology, Volume 121, Part A, 2016, Pages 53-61, ISSN 0301-0511

Table 1

Mean awareness rating (scale 0–3; SD in parenthesis) for each animal category as a function of presentation duration.

Their results:

Animal	Presentation duration (frames)				MEAN
	1	2	3	4	
Snakes	0.55 (0.42)	1.37 (0.43)	1.98 (0.47)	2.23 (0.42)	1.53 (0.75)
Spiders	0.41 (0.37)	1.02 (0.43)	1.63 (0.55)	1.97 (0.48)	1.26 (0.69)
Butterflies	0.44 (0.33)	1.64 (0.54)	2.36 (0.56)	2.64 (0.47)	1.77 (0.98)
Birds	0.51 (0.35)	1.89 (0.56)	2.49 (0.50)	2.76 (0.38)	1.91 (1)
MEAN	0.48 (0.06)	1.48 (0.37)	2.12 (0.39)	2.40 (0.37)	

Their conclusion:

Consistent with previous findings, we found that when participants were aware of the images, snakes provoked an enhanced EPN as compared with other animals.

Our observations

- **Snakes and butterflies** are the **most colorful** and had the **best accuracy**
 ⇒ possible correlation
- **Small number of participants** and all participants were **aware of the goal** of the study
 ⇒ possible bias