# The neural mechanisms of interoceptive conscious perception: A 7T fMRI study of afterimages

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**Primary Aim:** Map the cortical and subcortical fMRI responses for perceptually-matched images and afterimages. #2632

## 1. Motivation and Background

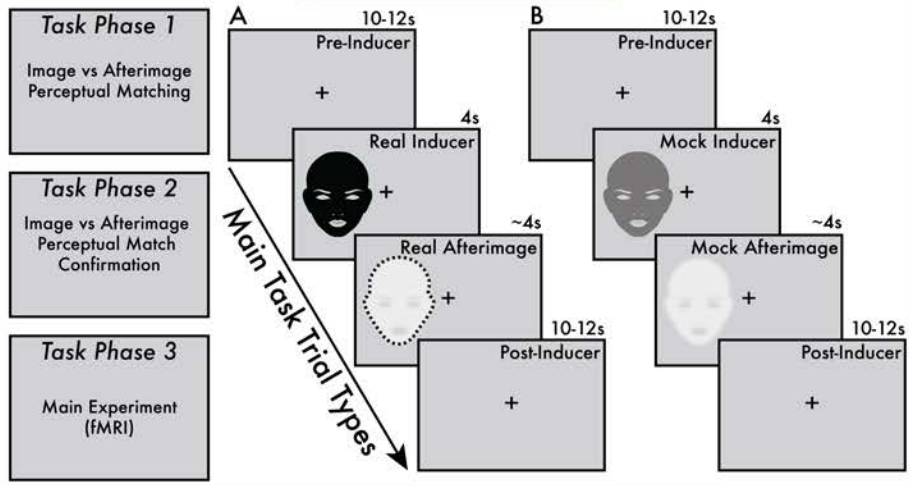
- Afterimages are illusory, visual-perseverations induced by a preceding image. (1)
- While the precise neural mechanism of afterimages is unknown, previous studies suggest both retinal and cortical contributions. (2,3)
- A challenge of contrasting exteroception vs interoception (e.g., vision vs imagery) is matching perceptual experience and task.
- Afterimages may be used as a model of interoception (e.g., imagery and hallucination).

## 2. Participants

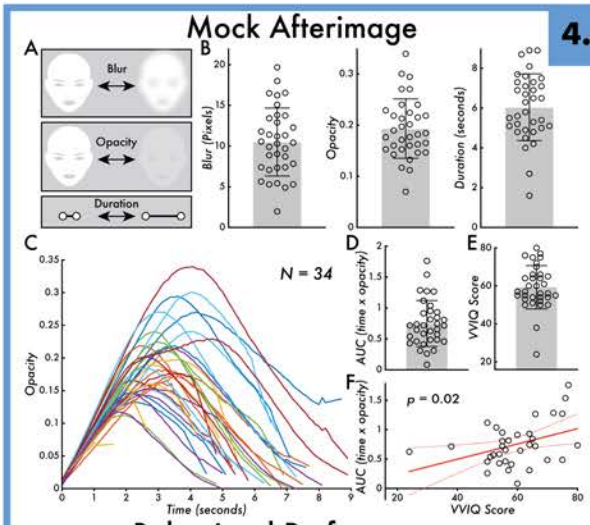
Behavioral: N = 63 (mean age: 29.1yrs; SD: 10.4yrs)

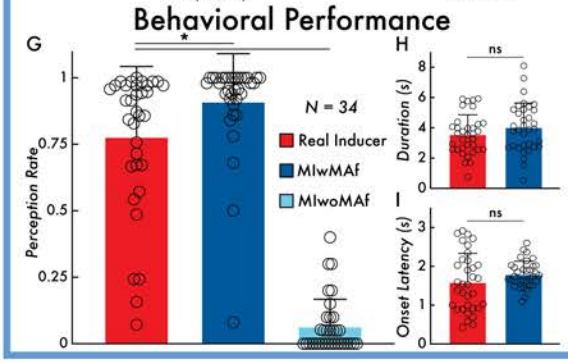
fMRI: N = 35 (mean age: 27.6yrs; SD: 8.5yrs)

## 3. Behavioral Task

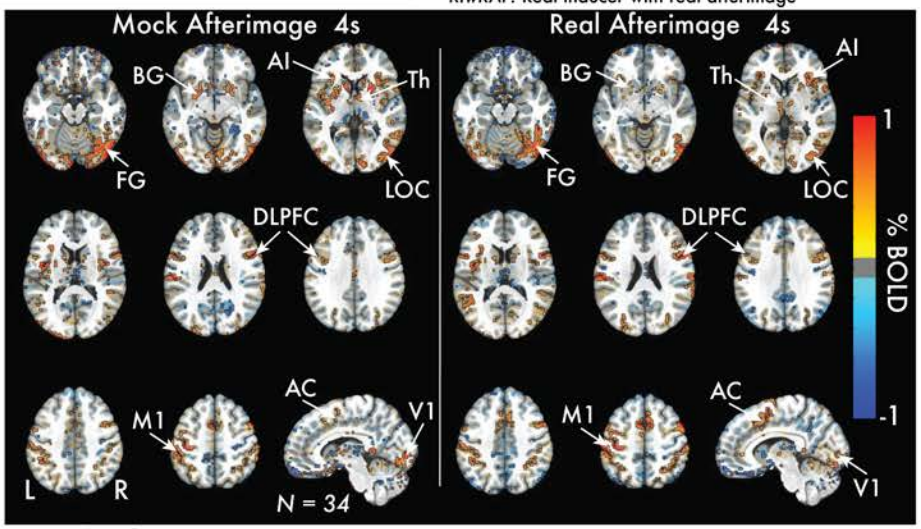


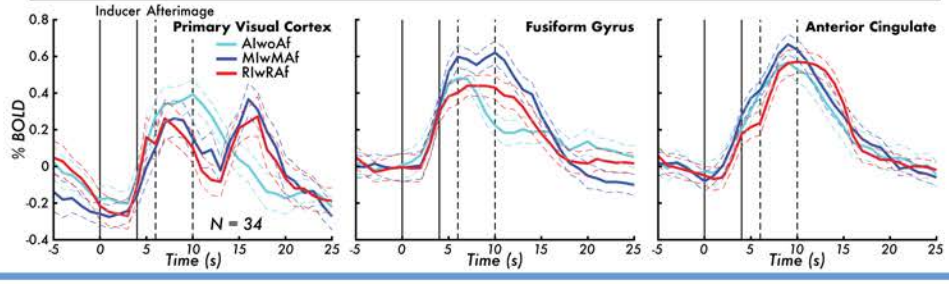

## 4. Behavioral and fMRI Results




**Acronym Key:** *AIwoAf:* All inducers without afterimage
*MIwMAf:* Mock inducer with mock afterimage
*RIwRAf:* Real inducer with real afterimage




## 5. Conclusions

- Face afterimages can be reliably induced in healthy participants and perceptually-matched by self-reporting (mock afterimage).
- Self-reported afterimage and imagery vividness (VVIQ) are positively correlated, suggesting a linkage.
- Perceptually and task-matched mock and real afterimages share widespread cortical and subcortical BOLD, including V1, LOC, AI, DLPFC, Th, and BG.
- Differences in BOLD are present in FG and AC.

## 6. Future Directions

- Study the feedforward and feedback contributions for image and afterimage perception in V1 with cortical layer resolution fMRI (VASO/BOLD; 0.8mm$^3$).

## References

1. Shimojo et al., Science, 2001
2. Dong et al., Scientific Reports, 2017
3. Sperandio et al., Nature Neuroscience., 2012