

# Interictal Migraine Reveals Insular Cortex Activation in Response to High- Frequency Stimuli

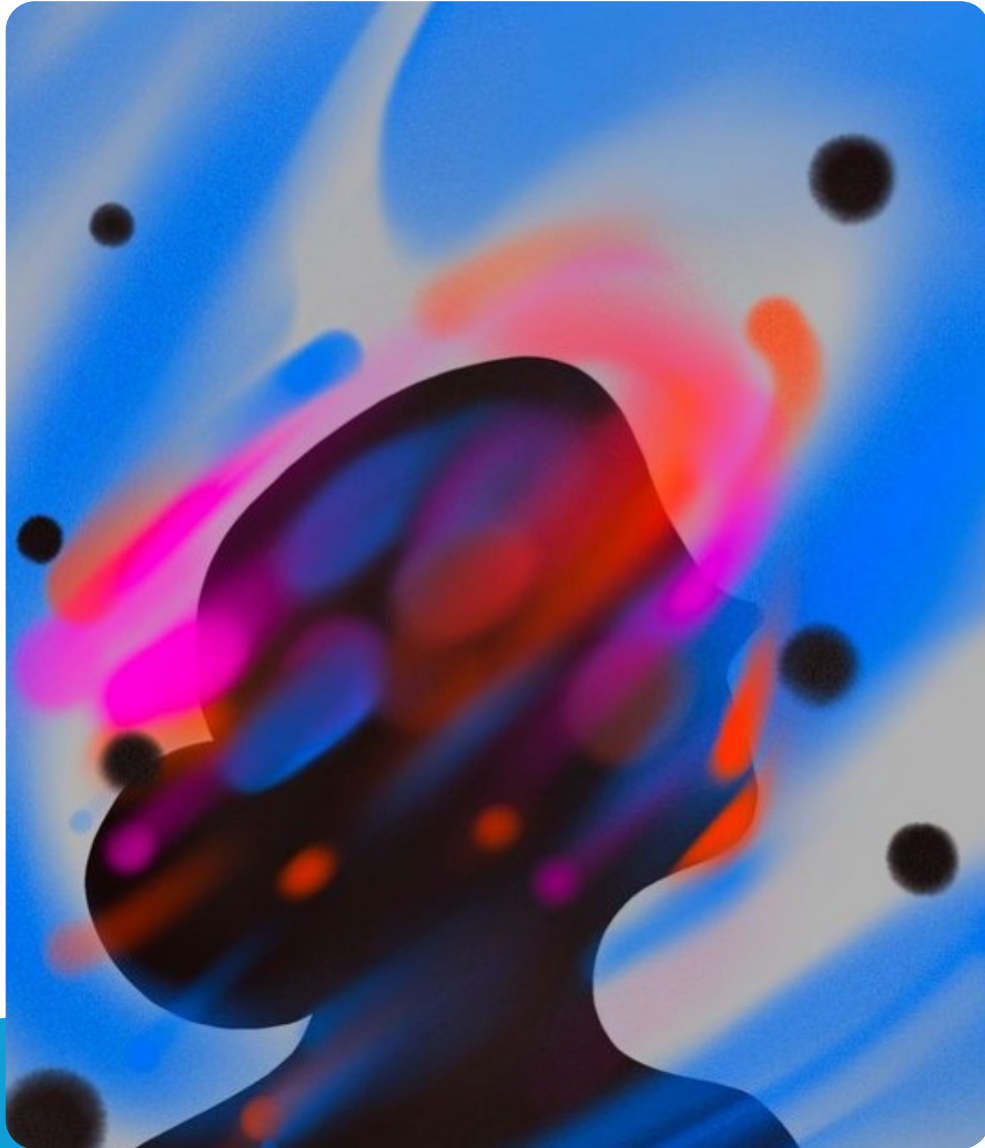
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This study is supported within the scope of the TÜBİTAK1004 project.



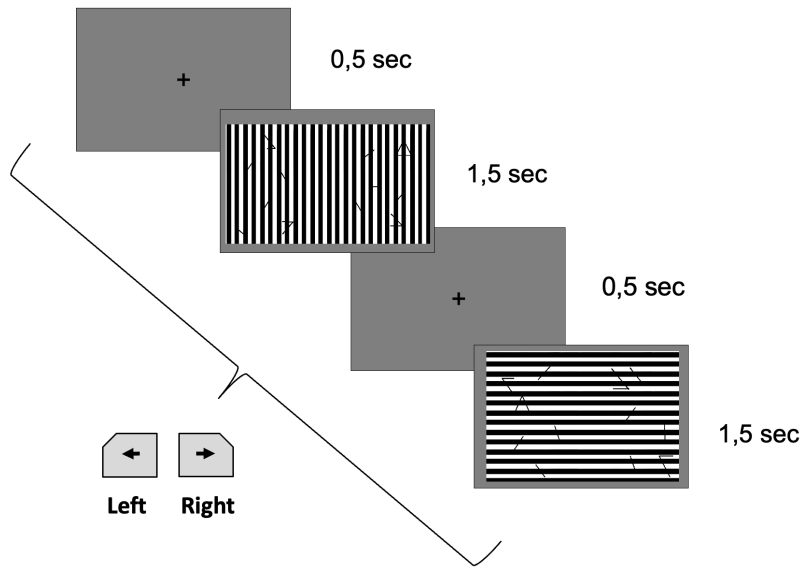
# Introduction

- Migraine is a neurological disorder characterized by
  - recurring episodes,
  - consisting of multiple phases,
  - accompanied by various cognitive and autonomic symptoms,
  - and differences in sensory processing.

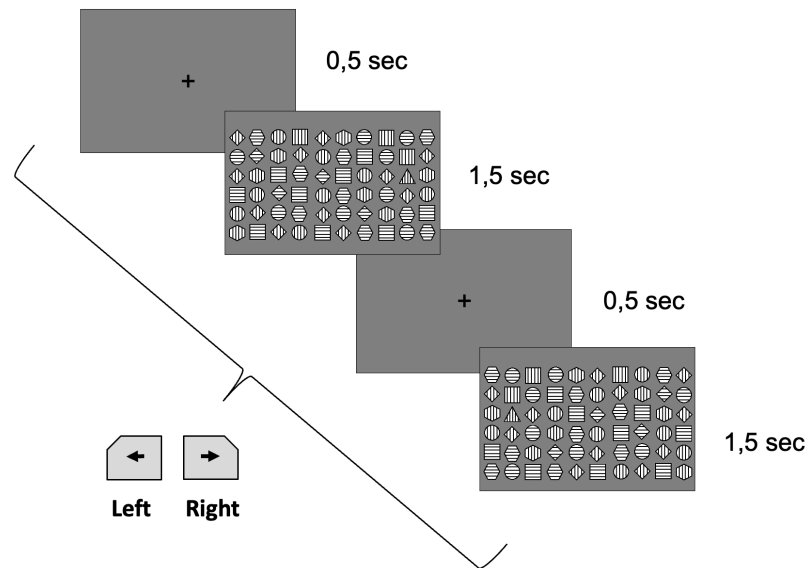
- The purpose of the research is to investigate the neural foundations of sensory processing in migraine patients using fMRI during a visual task.
  - Migraine patients were examined both during and outside of migraine attacks, and the results were compared with a healthy control group.



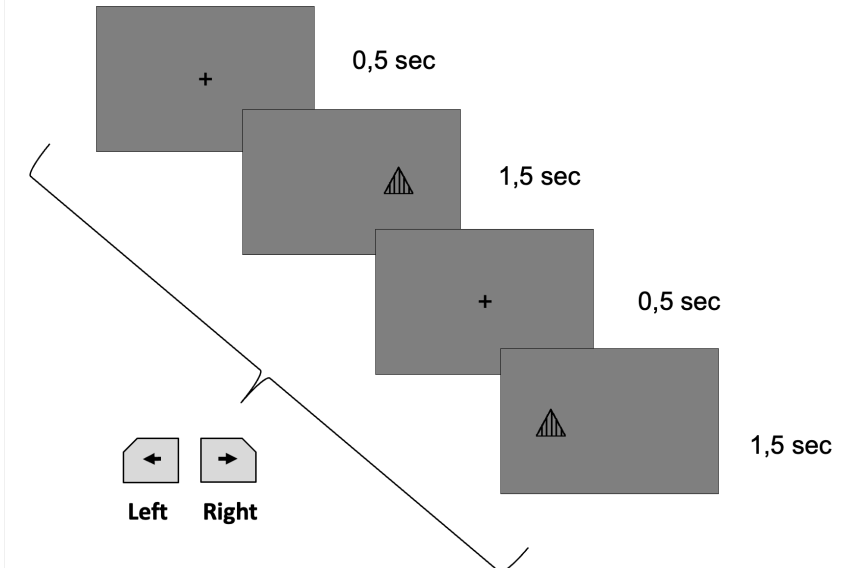
# Experimental Design



The task of finding the triangle on a striped background (striped condition)



The task of finding the triangle among different shapes (scanning condition)



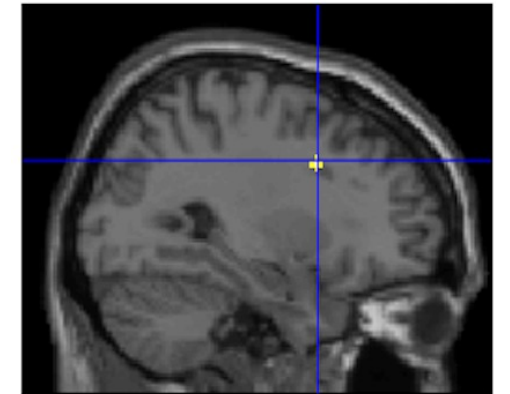
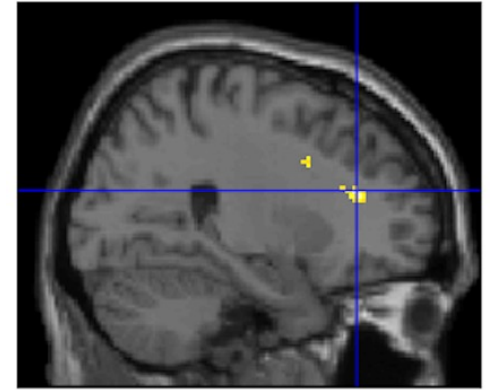
The task of finding the triangle on a plain background (control condition)

# Method

- The sample comprised 23 females (6 ictal, 8 interictal, 9 controls), chosen following clinical interviews.
- The specifications for the T1-weighted anatomical imaging are as follows:
  - TR: 2300 ms, TE: 3.01 ms, Voxel size: 0.9 x 0.9 x 0.9 mm<sup>3</sup>.
- The specifications for the T2-weighted functional imaging are as follows:
  - TR: 1000 ms, TE: 28.00 ms, Number of slices: 54, Voxel size: 2.5 x 2.5 x 2.5 mm<sup>3</sup>.
- The images were analyzed using SPM12.
  - The "Striped-Control" and "Scanning-Control" contrasts were compared across three participant groups.

# Results

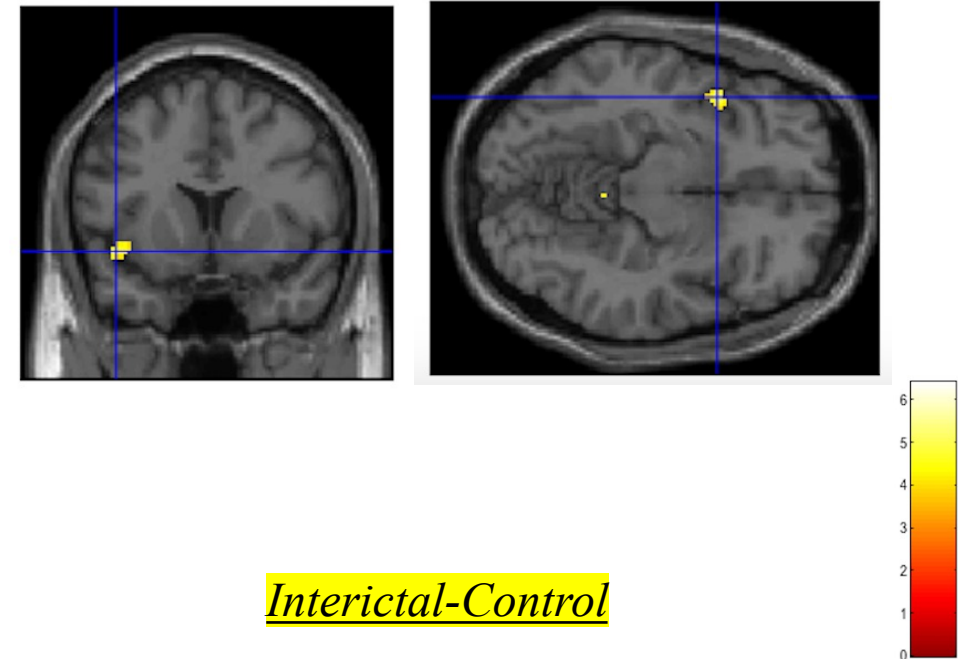
- In the striped task, differences between the control and the ictal group were observed in the following areas:
  - Dorsolateral Prefrontal Cortex
  - Frontal Eye Field
  - Visual Cortex
- These activations may indicate that individuals have difficulty maintaining visual and cognitive attention during a migraine attack.



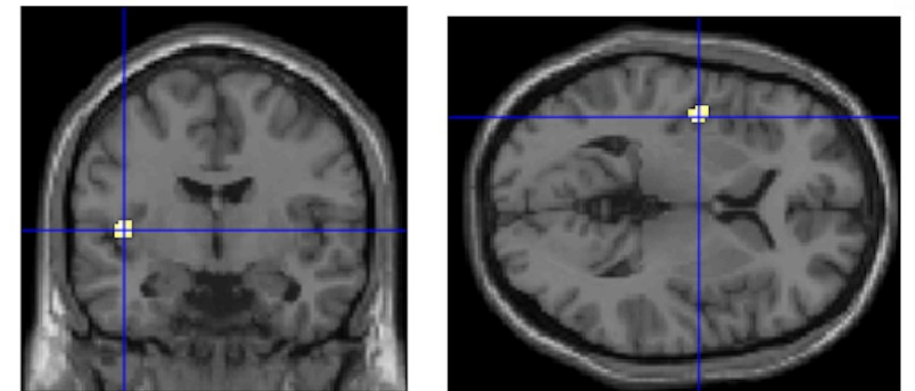
# Results

- In the striped task: activation in the insula was found in both interictal awareness and interictal control conditions.
  - The literature associates the insula with migraines.
  - The expectation of pain caused by high-contrast visuals may have led to insular activation.
  - There may be no difference in insular activation between high-contrast visual and control conditions during an attack.

Interictal-Ictal



Interictal-Control



# Conclusion

- Since migraine is associated with various sensory sensitivities, different types of tasks that are sensory challenging for patients have been created based on the literature and inspired by the patients' daily experiences.
- The insula may be a key region in the expectation of pain caused by disturbing stimuli.
- This study may shed light on a better understanding of the neural foundations of migraine and the development of more effective diagnostic and treatment methods.



# BG LAB

- The project is supported within the scope of the TÜBİTAK 1004 program with the project code 23AG014.
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