FUNCTIONAL NETWORK ACTIVITY
MEDIATING THE SHIFT OF ATTENTIONAL RESOURCES
DURING INATTENTIONAL DEAFNESS
IN AN AVIATION PURSUIT TASK

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Inattentional Deafness

Inattention to clearly audible information, dual-task

Inferior frontal gyrus suppresses auditory regions during high workload/low performance to focus on non-auditory primary task

Implies an attentional bottleneck

Inattentional Deafness
Audio Misses > Audio Hits

Psychophysiological Interaction Analysis
For the Contrast of Audio Misses > Audio Hits
Connectivity from IFG to the STG/MTG

Seed Voxel in IFG
MNI (52,18,-6)

T > 5.0
T > 3.0

X = 48
Y = -6
Z = -6

We manipulated distance→

Plane that the participant controls
Plane that the participant pursues
N = 17, half glider pilots, half novices
**Auditory Stimulus Volume**

- Heard while Flying
- Heard while Passive
- Missed while Flying
- Missed while Passive

**# of Stimuli**

**Auditory Stimulus Volume**

- Red: Mean
- Green: Median
Reaction Time

Heard while Flying RT

Heard while Passive RT

# of Stimuli

Reaction Time
How does auditory detection relate to ongoing performance?

Performance (ranges from 1 to 2)

Auditory Detection

Heard

Missed
How does auditory detection relate to distance to target?

- **Heard**
  - Distance (ranges from 10 to 200m)
  - Median: 60
  - Range: 45 to 75

- **Missed**
  - Distance (ranges from 10 to 200m)
  - Median: 55
  - Range: 50 to 70
Behavioral Results Summary

The flying task makes auditory detection harder, i.e. induces inattentional deafness

Worse performance on the flying task makes the auditory task even harder

No effect of distance manipulation on detection
Block

Flying

Task
Event

Flying > Passive
Block

Auditory Task
Event

Heard

> 

Missed
Event
Passive
> Flying & Missed
Event

Flying > Passive & Missed
Event

Flying > Passive & Missed > Heard
fMRI Results Summary

Inferior frontal gyrus suppresses auditory regions during high workload/low performance to focus on non-auditory primary task

Implies an attentional bottleneck

PPI connectivity analysis pending
Next steps...

Determine if IFG-auditory, frontal-posterior interaction is mediated by alpha inhibition driven by cross-frequency coupling

Extend findings to neuroergonomic contexts and applications
THANKS!

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