

WHAT ARE THE NEURAL NETWORK DYNAMICS AT REST RELATED TO EMOTION REGULATION IN MALE PERPETRATORS OF INTIMATE PARTNER VIOLENCE?

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INTRODUCTION

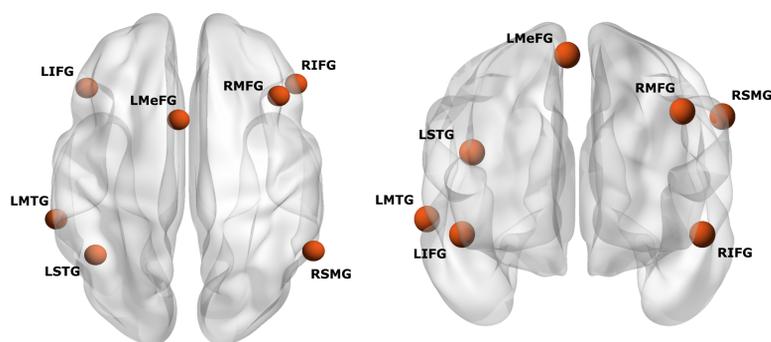
- Difficulties in emotion regulation seem to play a crucial role in intimate partner violence against women (IPVAW).
- Male perpetrators present difficulties in using reappraisal to down-regulate negative emotions.
- To date, the neural interactions within the down-regulation network in male perpetrators remain unknown.

RESEARCH AIM

Explore how effective connectivity at rest within the down-regulation network differs between male perpetrators compared to non-offenders.

METHODS

- **Participants:** 26 male perpetrators convicted for an IPVAV crime (mean age = 41.19, SD = 9.71) and 29 men with no criminal records (mean age = 38.28, SD = 8.54).
- Resting-state **fMRI scan:** 8 minutes. 3-T Siemens Trio MRI scanner with a 32-channel brain coil. T2*-weighted EPI sequence (TR = 2s, TE = 25ms, FOV = 238 x 238mm², 35 slices, voxel size = 3.5 x 3.5 x 3.5 mm³, 240 whole-brain volumes). **Preprocessing** implemented in CONN Toolbox.
- **Seven regions of interest** were selected:



- **General Linear Model**, including nuisance signals as regressors, was performed to obtain first-level maps.
- **Spectral Dynamic Causal Modelling** analysis was carried out to explore effective connectivity.
- A **fully-connected model** (49 connections) was estimated and inverted for each participant using a hierarchical empirical Bayesian inversion.
- **The between-group comparison** was performed by estimating a hierarchical model employing the Parametric Empirical Bayes framework.
- A **posterior probability of 95%** was used as a threshold for inference.

RESULTS

Male perpetrators compared to non-offenders:

- I. Increased inhibitory interconnectivity within **frontal regions**.
- II. Increased inhibitory connectivity from **frontal to temporoparietal** regions.
- III. Decreased inhibitory connectivity from **temporoparietal to frontal** regions.

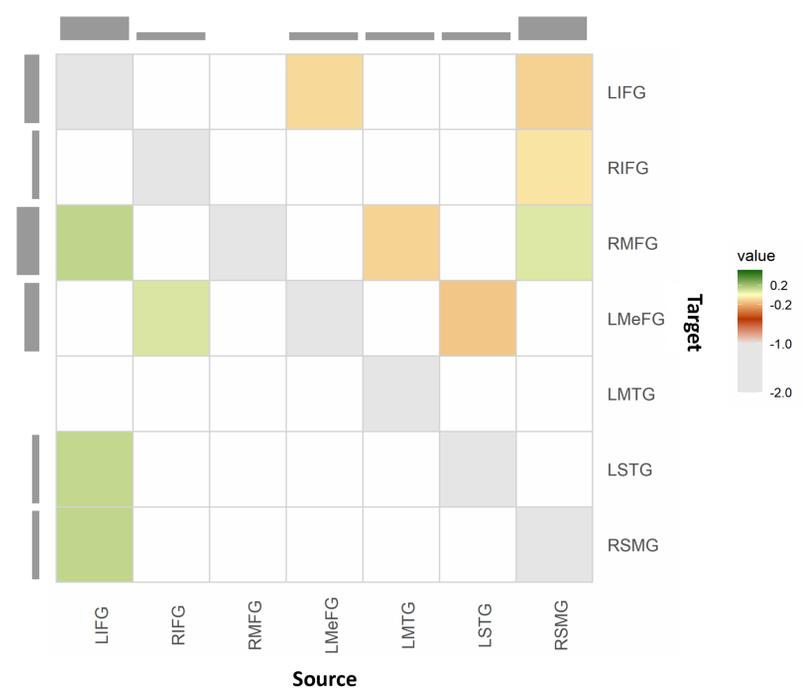


Fig. 1 Group-differences in effective connectivity. Effect sizes that remain significant after a 95% posterior confidence criteria are shown in colour. Positive values (green) indicate increased connectivity for MPG and negative values (orange) indicate reduced connectivity for MPG compared to both groups. Effective connectivity can be interpreted from source (column) to target (row).

CONCLUSIONS

- Male perpetrators present **different effective connectivity within the down-regulation network** compared to non-offenders.
- Results suggest an **altered reciprocal mechanism** from the prefrontal cortex to parietal regions.
- This knowledge promotes the work of **adaptive emotion regulation strategies** in intervention treatment with perpetrators and prevention programs.