

Table S1. Keyword combinations employed in the Pubmed research.

| Database | KEYWORDS | RESULTS |
|----------|-----------------------------------------------|------------|
| PubMed | tDCS AND aggressive behavior | 31 results |
| PubMed | tDCS AND aggression | 39 results |
| PubMed | tDCS AND frontal cortex AND aggression | 19 results |
| PubMed | tDCS AND parietal cortex AND aggression | 1 result |
| PubMed | tDCS AND occipital cortex AND aggression | no results |
| PubMed | tDCS AND temporal cortex AND aggression | 2 results |
| PubMed | rTMS AND aggressive behavior | 22 results |
| PubMed | rTMS AND aggression | 48 results |
| PubMed | rTMS AND frontal cortex AND aggression | 16 results |
| PubMed | rTMS AND parietal cortex AND aggression | 3 results |
| PubMed | rTMS AND occipital cortex AND aggression | 1 result |
| PubMed | rTMS AND temporal cortex AND aggression | 2 results |
| PubMed | Theta burst stimulation AND aggression | 5 results |
| PubMed | Non-invasive brain stimulation AND aggression | 18 results |

Description of the selection process.

Two independent researchers took part in the selection process. All the items from each keyword combination search have been exported to a CSV file. 13 CSV files (one per keyword combination, minus one which obtained 0 results) have been merged into a single Excel sheet, and duplicates were removed through the function “remove duplicates” based on the PMID code. Afterwards, title and abstract screening were conducted, leading to the selection of 19 items. After the full-text assessment, three more contributions were removed (2 not yet published preregistered reports and a study not reporting comparisons between active and sham stimulation), and a further item has been found by checking citations of included contributions.

Table S2: A total of 942 participants were exposed to stimulation in the studies included in this review. DLPFC=dorsolateral prefrontal cortex; VLPFC= ventrolateral prefrontal cortex; VMPFC=ventromedial prefrontal cortex; rTMS=repulsive transcranial magnetic stimulation; tDCS= transcranial direct current stimulation; cTBS= Continuous theta burst stimulation; MT=Motor Threshold; aMT=active Motor Threshold; BPD= Borderline personality disorder; STAS= State-Trait Anger Scale; TAP= Taylor Aggression Paradigm; BP-AQ= Buss-Perry Aggression Questionnaire; RPQ= Reactive-Proactive Aggression Questionnaire; PSAP=Point Subtraction Aggression Paradigm; CRTT=Competitive reaction-time task; SOC=Social Orientation Paradigm; BIS-11= Barratt Impulsivity Scale-11; TBI=Traumatic brain injuries; N/A=not applicable; PTSD=Post-Traumatic Stress Disorder; SUD=Substance Use Disorder; STAXI-2=State-Trait Anger Expression Inventory-2; BEHAVE-AD= Behavioral pathology in Alzheimer's disease rating scale; PANAS= Positive and Negative Affect Schedule.

| Authors | Participants | M | M _{age} ± SD/ Range | NIBS type | Stimulation site/polarity | Electrode size/ TMS coil | Freq./ Intens. | Sessions/ Duration | SHAM | Baseline aggression measure | Measure | Outcome and direction | Study type |
|-------------------------------|-------------------------|----|---------------------------------|-----------|-------------------------------------------------------------------|-------------------------------------------------------|-------------------|-----------------------|----------------------------------|-----------------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Chen, 2018 [182] | 32/Healthy participants | 16 | 20.40 ± 1.33 | tDCS | rVLPFC (F6)/anode; Oz/cathode | 35 cm ² | 2mA | 12.5 min | 20s fade-in-fade-out stimulation | RPQ | TAP | Reduced aggression induced by active stimulation over the rVLPFC in both TAP proactive and reactive aggression scores | Between-subjects, single-blind, randomized sham-controlled design |
| Choy et al., 2018 [194] | 81/Healthy participants | 36 | 20.21 ± 3.31/ ≥18 years | tDCS | bilateral DLPFC (F3 and F4)/anodes; extracephalic /cathodes | 25 cm ² anodes, 35 cm ² cathode | 1 mA | 20 min | 30s fade-in-fade-out stimulation | RPQ | Intentions to commit aggression ; VDT | Reduced aggression intentions after active stimulation over the bilateral DLPFC (vs.sham), but no difference in the VDT | Between-subjects, double-blind, randomized sham-controlled design, follow-up |
| Dambacher et al., 2015a [185] | 64/Healthy participants | 39 | 21.89 ± 3.26 | tDCS | G1: rVLPFC (F8)/anode, IVLPFC (F7)/cathode; G2: vice versa | 35 cm ² | 1.5 mA | 21.75 min | 20s fade-in-fade-out stimulation | RPQ | TAP | No effect of tDCS over the rVLPFC or IVLPFC | Between-subjects, single-blind, randomized sham-controlled design |
| Dambacher et al., 2015b [189] | 32/Healthy participants | 13 | 22.14 ± 2.00 | tDCS | rDLPFC (Faf)/anode; left eyebrow/cathode | 35 cm ² | 2mA | 12.5 min | 20s fade-in-fade-out stimulation | RPQ | TAP | Reduced proactive (but not reactive) aggression after active stimulation over the rDLPFC only in men (vs. sham, vs. women) | Between-subjects, single-blind, randomized sham-controlled design |
| Gallucci et al., 2020 [183] | 90/Healthy participants | 45 | 22.27 ± 2.46 | tDCS | G1: IVLPFC (F5)/anode; G2: rVLPFC (F6)/anode; Both: contralateral | 25 cm ² anode, 35 cm ² cathode | 1.5 mA | 20 min | 10s fade-in-fade-out stimulation | BP-AQ | CRTT, number of difficult numerical sequences and Tangram | Increased aggression induced by active stimulation over the IVLPFC after frustration, no effect of active stimulation over the rVLPFC. Higher | Between-subjects, single-blind, randomized sham-controlled design |

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| | | | | | supraorbital/cathode | | | | | | puzzles assigned to the partner | aggression in active stimulation (but no sham) in women (vs men) | |
| Gilam et al., 2018 [201] | 25/Healthy participants | 10 | 26.16 ± 3.63/21-33 years | tDCS | VMPFC (Fpz)/anode, right shoulder/cathode | 35 cm² | 1.5 mA | 22 min | 30s fade-in-fade-out stimulation | TAP | TAP | Reduced aggression induced by active stimulation over the VMPFC only in active-sham order (not in the opposite order) | Crossover, double-blind, randomized sham-controlled design |
| Hortensius et al., 2012 [188] | 80/Healthy participants | 40 | N/A | tDCS | G1: IDLPFC (F3)/anode, rDLPFC(F4)/cathode; G2: vice versa | 35 cm² | 2 mA | 15 min | 5s fade-in-fade-out stimulation | PANAS | TAP | Increased anger-driven aggression after left-anodal-right-cathodal active stimulation (vs sham) but no effects of right-anodal-left-cathodal | Between-subjects, double-blind, randomized sham-controlled design |
| Ling et al., 2020 [203] | 94/Healthy participants | 47, 80 % | 18-28 years | HD-tDCS | VMPFC (Afz)/anode, Fp1, Fp2, F1, and F2/cathodes | Circular 2cm² | 2 mA | 20 min | 30s fade-in-fade-out stimulation | BP-AQ | VDT | No effect of HD-tDCS over the Afz | Between-subjects, double-blind, randomized sham-controlled design |
| Lisoni et al., 2020 [191] | 30/clinical (BPD) | 12 | 40.3 ± 12.8/18-61 | tDCS | rDLPFC (F4)/anode; IDLPFC (F3)/cathode | 35 cm² | 2mA | 15 sessions/20 min | 20s fade-in-fade-out stimulation | BP-AQ | BP-AQ | Reduced overall aggression score after active tDCS (vs. sham) | Between-subjects, double-blind, randomized sham-controlled design |
| Molero-Chamizo et al., 2019 [195] | 41/forensic (violent murderers vs non-murderers) | 41 | 36.2 ± 12.3/≥19 years | tDCS | bilateral DLPFC (F3 and F4)/anodes; bilateral frontopolar cortex (Fp1 and Fp2)/cathodes | 25 cm² anodes, 35 cm² cathodes | 1.5 mA | 3 sessions/15 min | 10s fade-in-fade-out stimulation | BP-AQ | BP-AQ | Reduced aggression scores induced by active stimulation over bilateral DLPFC in murderers and non-murderers group (vs.sham) | Between-subjects, single-blind, randomized sham-controlled design |
| Perach-Barzilay et al., 2013 [199] | 16/Healthy participants | 14 | 28±4.67/23-38 years | cTBS | IDLPFC vs. rDLPFC in two different sessions | 70 mm figure-eight coil | triple-pulse 50 Hz at a rate of 5Hz/100 %aMT | 1 session/1 min | Placebo coil | SOP | SOC | Increased aggression after inhibition of IDLPFC but not rDLPFC (vs. sham) | Crossover single-blind, randomized sham-controlled design |

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| Riva et al., 2015 [178] | 80/Healthy participants | 21 % | 23.06 ± 4.36 | tDCS | rVLPFC (F6)/anode, contralateral supraorbital/cathode | 25 cm ² anode, 35 cm ² cathode | 1,5 mA | 20 min | 8s fade-in, 5s fade-out stimulation | STAXI | Hot-sauce paradigm | Reduced aggression in socially excluded but not in non-socially excluded participants after active stimulation (vs. sham) | Between-subjects, single-blind, randomized sham-controlled design |
| Riva et al., 2017 [181] | 79/Healthy participants | 40 | 21.73 ± 2.38 | tDCS | rVLPFC (F6)/anode; contralateral supraorbital/cathode | 25cm ² anode, 50cm ² cathode | 1.5 mA | 20 min | 20s fade-in-fade-out stimulation | N/A | TAP | Reduced unprovoked-proactive but not provoked-reactive aggression after active stimulation in violent video game players | Between-subjects, single-blind, randomized sham-controlled design |
| Sergiou et al., 2022 [206] | 50/clinical (diagnosed alcohol and/or cocaine SUD) | 50 | 37.40 ± 9.19/ 22-62 years | HD-tDCS | bilateral VMPFC (Fpz)/anode, AF3, AF4, F3, F4 and Fz/cathodes | circular π cm ² | 2mA anode, - 0.4mA each cathode | 10 sessions/20 min | 30s fade-in-fade-out stimulation | PSAP, RPQ | PSAP, RPQ | Reduced PSAP reactive aggression score in active tDCS (vs sham), reduction in RPQ scores in both active and sham | Mixed between-within-subjects, double-blind, RCT |
| Smits et al., 2021 [186] | 96/clinical (Military with PTSD, anxiety, or impulsive aggression problems), of which 45 tested for aggression) | 89 | 18-60 | tDCS | rIFG-rVLPFC (in between F8, Cz, T4, and Fz)/anode, left supraorbital/cathode | 35 cm ² | 1.25mA | 5 sessions/20 min | 16s fade-in-fade-out stimulation | STAXI-2 | STAXI-2 | No effect of tDCS over rVLPFC | Mixed between-within-subjects, double-blind, RCT |
| Weidler et al., 2022 [190] | 51/clinical (Alcohol abuse), healthy smokers and non-smokers | 51 | 18-60 | tDCS | rDLPFC (F4)/anode, left supraorbital/cathode | 35 cm ² anode, 100 cm ² cathode | 1.5mA | 20 min | 20s fade-in-fade-out stimulation | TAP | TAP | Reduced increase in aggression over time only in alcohol abusers who received active stimulation, but not healthy volunteers or sham conditions. | Mixed between-within-subjects, double-blind, RCT |
| Wu et al., 2015 [197] | 52/clinical (Alzheimer) | 21 | 71.6± 4.8 [60-80] | rTMS | IDLPCF | figure-eight coil | 20Hz/80 %MT | 20 sessions/1 min | Coil turned 180 degrees | Aggressiveness subscale of BEHAVE-AD scale | Aggressiveness subscale of BEHAVE-AD scale | Decreased aggression score after active rTMS over IDLPFC, but not after sham. | Mixed between-within-subjects, double-blind, RCT |