Right Posterior Parietal Cortex is involved in disengaging from threat: a 1-Hz rTMS study

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Supplementary Materials for

Right posterior parietal cortex is involved in disengaging from threat: a 1 Hz rTMS study

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Supplementary Analyses 1: Simple effects reaction time analyses

Follow-up one-way repeated-measures ANOVAs for each of the three rTMS conditions separately with distractor (CS+, CS-, absent) as factor showed a significant effect for the sham rTMS condition ($F(2,42) = 9.38$, $p < 0.01$, $\eta^2_p = 0.31$). Pairwise comparisons showed that reaction was increased when the distractor was present relative to absent for the CS+ distractor and the CS- distractor (both *p*s < .01). There was no difference in reaction time between the CS+ distractor and the CS- distractor ($p = .74$).

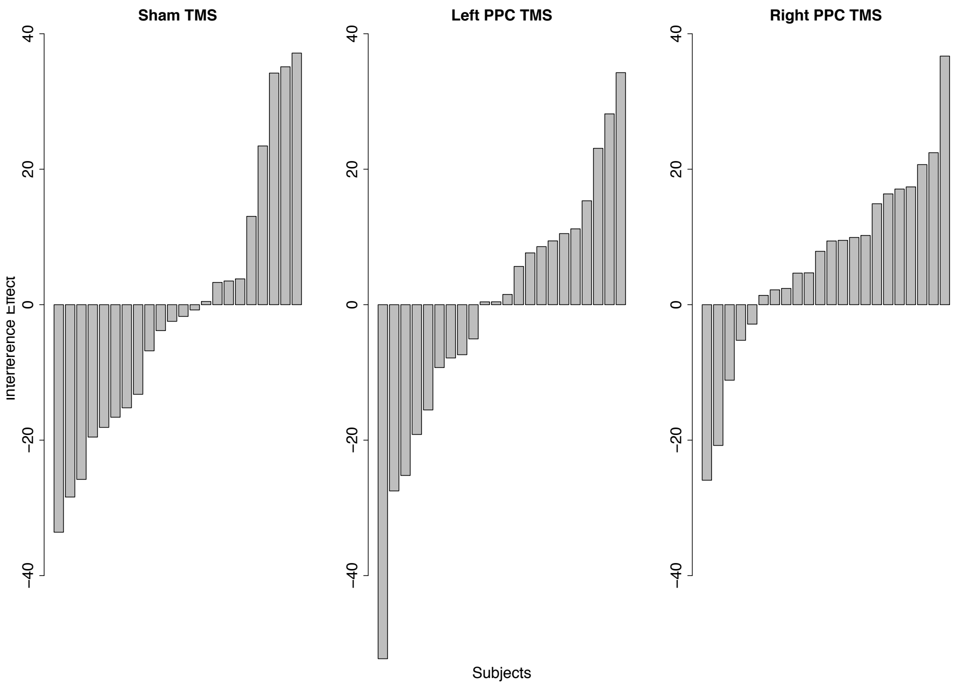
For the left rTMS condition the ANOVA showed a significant effect of distractor ($F(2,42) = 21.91$, $p < 0.01$, $\eta^2_p = 0.51$). Pairwise comparisons showed that reaction time was increased when the distractor was present relative to absent for the CS+ distractor and the CS- distractor (both *p*s < .01). There was no difference in reaction time between the CS+ distractor and the CS- distractor ($p = .89$).

For the right rTMS condition the ANOVA showed a significant effect of distractor ($F(2,42) = 18.80$, $p < 0.01$, $\eta^2_p = 0.47$). Pairwise comparisons showed that reaction was increased when the distractor was present relative to absent for the CS+ distractor and the CS- distractor (both *p*s < .01). Moreover, there was a significant difference in reaction time between the CS+ distractor and the CS- distractor ($p < .05$), due to increased reaction time when the CS+ distractor was present relative to the CS- distractor (see Table 1).

Supplementary Analyses 2: Individual differences

Because we did not observe the expected emotional interference effect in the sham condition as reported in (Schmidt et al., 2016), we inspected individual differences in the emotional interference effect (EIE = CS+ minus the absent condition vs. CS- minus the absence condition) across all rTMS conditions. Specifically, we tested whether the significant increase in the emotional interference effect observed after right PPC rTMS occurs generally for our sample of participants, or whether it is driven by a small subset of subjects showing relatively extreme results, or possibly conspicuous behavioral patterns in the sham condition. Figure S1 plots the magnitude of the EIE for each subject in each rTMS condition and illustrates that there is a subset of individuals who show a differential interference effect in the sham condition (left panel). Moreover, it is clearly visible from the distributions shown in Figure S1 that particularly after inhibitory rTMS to right PPC the number of individuals showing an emotional interference effect increases substantially (subjects showing EIE after sham: 40.9%; left TMS: 59.1%, right TMS: 77.3%). This illustration agrees with our main results, which show that the average emotional interference effect is significant after right PPC stimulation (right PPC rTMS: $t(21) = 2.14$, $p < 0.05$, $d = 0.45$), but not after left PPC stimulation (left PPC rTMS: $t(21) = .141$, $p = 0.89$, $d = 0.03$), nor after Sham ($t(21) = -0.339$, $p = 0.74$, $d = 0.07$).

Figure S1. Emotional Interference Effect (EIE) across all TMS conditions



Next, we ran a regression analysis investigating whether the magnitude of the interference effect during the sham condition predicts the magnitude during either of the rTMS conditions. A significant correlation between the EIE during sham and the rTMS conditions would indicate that the enhancement of the emotional interference effect observed after right PPC rTMS occurs generally for our sample of participants and is not driven by a small subset of subjects showing relatively extreme results, or very different behavioral patterns during the sham condition. To test this, we ran the following OLS regression with robust standard errors corrected for clustering on the individual level using the “regression modelling strategies” (RMS) package in R:

EIE_rTMS = b0 + b1 EIE_Sham + b2 Condition + b3 EIE_Sham X Condition + error

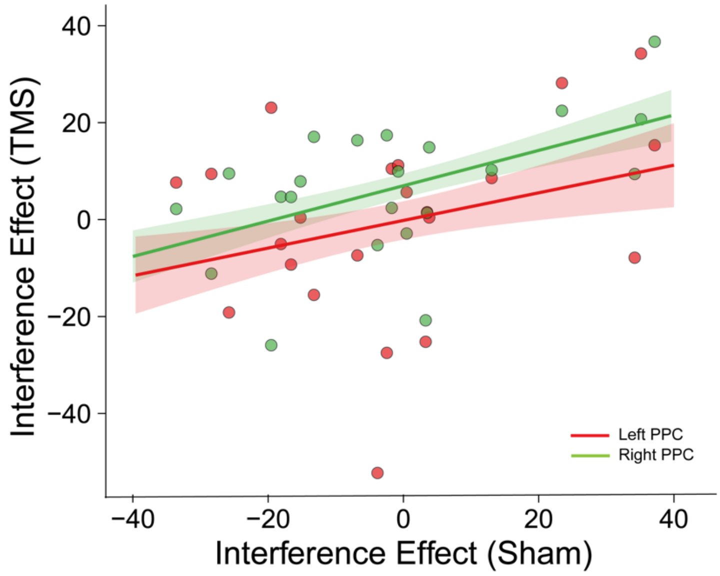
Where the EIE_rTMS reflects the emotional interference effect during the experimental rTMS conditions, EIE_Sham reflects the emotional interference effect during the control rTMS condition, and Condition reflects a dummy variable identifying the specific rTMS condition (with 1 for left rTMS and 0 for right rTMS).

Table S1 shows that we find a significant main effect of sham (coefficient = 0.37, $p = 0.004$) and no interaction (coefficient = -0.08, $p = 0.7$). These results indicate that the magnitude of the interference effect during sham is associated with the magnitude of the interference during both rTMS conditions (illustrated in Figure S2). The positive correlation between the two conditions shows that subjects with a relatively low (respectively, relatively high) interference effect in the sham condition also have a relatively low (respectively, relatively high) interference effect in the rTMS conditions.

Table S1. Regression results testing the association between the magnitude of the interference effect during Sham and TMS conditions.

	Coef. (SE)	T	P
Intercept	6.9799 (2.5132)	2.78	0.0083
Sham	**0.3646 (0.1184)**	**3.08**	**0.0037**
TMS	-7.1566 (4.4508)	-1.61	0.1157
Sham * TMS	-0.0796 (0.2077)	-0.38	0.7037

Figure S2. Significant positive relationship between the emotional interference effect during sham and both TMS conditions reflective of the main effect of sham.



Therefore, rTMS does not impact the relative ordering of subjects, which would have been reflected by a non-significant relationship between EIE during sham and TMS. Importantly, the presence of a correlation between the magnitude of the emotional interference effect during sham and right rTMS indicates clearly that this enhancement of the emotional interference effect after right PPC rTMS occurs generally for our sample of participants (see also Figure S1) and is not driven by a small subset of subjects showing relatively large effects after right PPC rTMS. Taken together, these results support the argument made in the main paper that right rTMS leads to an enhancement of the emotional interference effect.