

**Study Title:**

Cognitive Enhancement through Transcranial Laser Therapy (LLLT)

**Clinicaltrials.gov Registration Number:** NCT02851173

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1. **Title:**

Cognitive Enhancement through Transcranial Laser Therapy

2. **Principal Investigator:**

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Department: Psychology

**Statistical Plan:**

1. Primary outcome measure (PVT) will be analyzed using mixed ANOVA with 1 between-subjects factor (Treatment Group) and 1 within subjects factor (Time). Cognitively unimpaired (CU) and MCI groups will be analyzed separately. The contrast of interest will be Treatment Group by Time interaction. Alpha level of significance will be set at 0.05.
  - a. Secondary outcome measures (2Back performance, % Correct and Reaction Time) will be analyzed using mixed ANOVA with 1 between-subjects factor (Treatment Group) and 1 within subjects factor (Time). Cognitively unimpaired (CU) and MCI groups will be analyzed separately. The contrast of interest will be Treatment Group by Time interaction. Alpha level of significance will be set at 0.05.
  - b. Secondary outcome measures (2Back activation intensity within 8 *a priori* ROIs) will be analyzed using mixed ANOVA with 1 between-subjects factor (Treatment Group) and 1 within subjects factor (Time), only for participants who can perform the task to criterion (%Correct>50%). Cognitively unimpaired (CU) and MCI groups will be analyzed separately. The contrast of interest will be Treatment Group by Time interaction. Alpha level of significance will be set at 0.05 due to the exploratory nature of the analysis.
  - c. *A priori* ROIs were chosen based on prior literature. They are as follows:

ROI#	x	y	z	size (mm2)	designation
1	-33	4	56	2087	Left middle frontal gyrus
2	-5	19	44	1651	Left medial frontal/superior frontal gyrus
3	37	-63	53	683	Right superior parietal lobule
4	-49	-52	44	1333	Left inferior parietal lobule
5	-44	45	13	1139	Left middle frontal gyrus
6	33	48	15	955	Right superior frontal gyrus
7	32	5	55	553	Right middle frontal gyrus
8	47	14	3	335	Right inferior frontal gyrus