KPU Registry ID Number 1049 **Date submitted: 21st February 2019**

Study Registration for the KPU Study Registry

The registration information for the study is given below. Each section can be expanded as needed.

1. The title or name of the experiment (for listing the experiment in the registry).

Mind-matter interaction at distance on a standalone device

2. The name, affiliation, and email address for the lead experimenter(s) for the study.

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3. A short description or abstract of the purpose and design of the experiment.

We this experiment we aim to demonstrate that it is possible to activate an electronic device at distance mentally.

The details of the device, we named MindSwitch, are available here: https://github.com/tressoldi/MindSwitch

Briefly, this device is based on a TrueRNG™ connected with a Raspberry PI microcontroller. When the software installed on the Raspberry PI detects a prespecified reduction of the TrueRNG™ entropy (randomness) calculated with the frequency monobit and the run tests of the NIST battery (Bassham et al., 2010), it will trigger an electronic signal that can be used for different purposes e.g. to light on/off a light or sending a Bluetooth signal.

4. A statement or list of the specific hypothesis or hypotheses being tested, and whether each hypothesis is confirmatory or exploratory. (confirm/explore guidance)

Confirmatory hypothesis: the percentage of triggered electronic signals emitted by the MindSwitch during the periods of mental interaction at distance, will exceed that observed prior and following this interaction.

Exploratory hypothesis: trials performed by pairs or small group of participants will obtain better performance with respect to the trials performed by single participants.

5. The planned number of participants and the number of trials per participant.

We planned to record at least **100 trials** collected by selected participants acting individually in pairs or in small groups (three to four participants), that can contribute with series of blocks of 5 trials.

6. A statement that the registration is submitted prior to testing the first participant, or indicating the number of participants tested when the registration (or revision to the registration) was submitted.

The registration is submitted prior to testing the first participant

The following additional information is needed for studies that include confirmatory analyses:

7. Specification of all analysis decisions that could affect the confirmatory results, including: the specific statistical test for each confirmatory hypothesis, whether the test is one-sided or two-sided, the criterion for acceptable evidence, any transformations or adjustments to the data, any criteria for excluding or deleting data, and any corrections for multiple analyses. Checklists and examples for registering classical analyses, permutation and bootstrap analyses, Bayesian analyses, and classification analyses are provided in the statistics registration document. **(This information can be included in section 4 above for simple experiments.)**

From a statistical point of view, we will compare pairwise the percentages of triggered signals observed before the mental interaction (bMI) with those observed during the mental interaction (MI) and those observed during the MI with those observed after this phase (aMI). We expect a raw effect size of at least a difference of 30% between the conditions bMI vs MI and MI vs aMI, one-tailed, that is we expect a higher percentage of triggered signals during the MI phase with respect both the bMI and aMI.

We will compare these percentage pairwise using the z score test for two population proportions, setting an alpha = .05/number of comparisons applying the continuity correction.

8. The power analysis or other justification for the number of participants and trials.

The number of trials was estimated with the function pwr.2p.test of the pwr package v. 1.2, (Champely, S., Ekstrom, C., Dalgaard, P., Gill, J., Weibelzahl, S., Anandkumar, A., ... & De Rosario, M. H. (2018). Package 'pwr'), setting alpha= .05; power = .9 and a difference of .30 between the two proportions

9. The methods for randomization in the experiment. If a pseudorandom generator is used, specify how and when the seed(s) will be obtained.

10. A detailed description of the experimental procedure.

Selected participants, both single in pairs or in small groups, will be asked to interact mentally and at distance (without any direct physical contact) with the MindSwitch in order to trigger a signal. They could observe directly the MindSwitch or by remote connection e.g. via Skype.

The parameters will be fixed for all trials: bits/sec = 200; total time for each trial = 15 minutes; statistical analysis of the bits samples: every 60 seconds; trigger cutoff: $p < .05$ for at least one of the two test (frequency monobit or run test).

Before, during and after this interaction, a research assistant will be activating the MindSwitch for the same duration, in order to collect bMI, MI and aMI data. For each trial, the data will be stored automatically in a file for the later analyses.

Given that the signal emitted by the MindSwitch is visible, the research assistant will be instructed to move to a location where the signal will be no more detectable in order not to interfere with the task and prevent any selection of data based on the participants' results.

When the participant(s) declare to be ready, they will perform the MI with the MindSwitch adopting their preferred strategies, which will be described after the trial, for the later qualitative analyses.

Participants' selection criteria: strong interest for the subject of the experiment and experience in mental control obtained by meditation or other similar practices, ascertained by a direct interview.

The research assistant will send the files with the stored data to the principal investigator without inspecting them in order to prevent any selection of data based on the participants' results.

References

Bassham, L. E., Rukhin, A. L., Soto, J., Nechvatal, J. R., Smid, M. E., Barker, E. B., … Vo, S. (2010). *A statistical test suite for random and pseudorandom number generators for cryptographic applications*. Gaithersburg, MD. https://doi.org/10.6028/NIST.SP.800-22r1a