







Investigation of non-invasive brain stimulation and its associated placebo effects on visual memory

Submission date 07/02/2023	Recruitment status No longer recruiting	 Retrospectively registered
		 Protocol added
Registration date 10/02/2023	Overall study status Completed	 SAP not yet added
		 Results added
Last Edited 15/05/2024	Condition category Not Applicable	 Raw data not yet added
		 Study completed

Plain English Summary

Background and study aims

The goal of this study is to determine the extent to which the benefits of non-invasive brain stimulation (NIBS) on visual memory performance among young non-disabled adults are due to the actual treatment effect versus the placebo effect. NIBS is a low-cost and low-risk method believed to improve various health outcomes such as cognition, pain, and motor function. However, the evidence for the reliable and valid impact of NIBS on these outcomes is inconsistent. The study aims to measure both the treatment and placebo effects of NIBS. This will improve our understanding of how much of the improvement in performance is driven by the treatment effect versus the placebo effect. Previous studies on NIBS do not typically record participant expectations for NIBS, making it challenging to conclude whether positive or null results are due to a lack of treatment effect or an imbalance in the placebo effect between groups.

Who can participate?

Adults aged 18 years and over who are right-handed and pass the screening questionnaire

What does the study involve?

Participants will be randomly allocated to one of three groups: an anodal tDCS group, a sham tDCS group and a no-tDCS control group. The intervention used in this study is non-invasive brain stimulation, specifically transcranial direct current stimulation, to be applied to the area of the scalp over the right parietal cortex of the brain.

What are the possible benefits and risks of participating?

There is no direct benefit to participants. Possible risks are minimal in regard to active brain stimulation. The primary side effects reported due to the use of non-invasive brain stimulation are scalp tingling and minor discomfort of the scalp.

Where is the study run from?

Arizona State University (USA)

When is the study starting and how long is it expected to run for?
January 2019 to May 2024

Who is funding the study?

1. Arizona State University Global Sport Institute (USA)
2. Arizona State University Graduate College JumpStart Program (USA)

Who is the main contact?

Dr Sydney Schaefer, sydney.schaefer@asu.edu

Contact information

Type(s)

Principal Investigator

Contact name

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Additional identifiers

EudraCT/CTIS number

Nil known

IRAS number

ClinicalTrials.gov number

Nil known

Protocol/serial number

10.17605/OSF.IO/E7GW3 Subjects

Study information

Scientific Title

Evidence and sources of placebo effects in transcranial direct current stimulation during visuospatial working memory training

Acronym

TDCS PM

Study hypothesis

Hypothesis 1a: Anodal transcranial direct current stimulation (tDCS) on the right parietal lobe will improve the rate and amount of motor skill acquisition, as well as subsequent visuospatial performance post-stimulation, compared to sham tDCS.

Hypothesis 1b: Sham tDCS will improve the rate and amount of motor skill acquisition, as well as subsequent visuospatial performance post-stimulation, compared to no tDCS.

Hypothesis 2: Individuals with higher tDCS expectancy will demonstrate better rate and amount of motor skill acquisition, as well as better subsequent visuospatial performance, while controlling for stimulation type (anodal or sham).

Ethics approval required

Old ethics approval format

Ethics approval(s)

Approved 03/03/2019, Arizona State University Office of Research Integrity and Assurance (1151 S Forest Ave Tempe, AZ 85281, USA; +1 (0)480 965 6788; research.integrity@asu.edu), ref: STUDY00015526

Study design

Randomized three-armed mixed within- and between-subjects design. For hypothesis 1a (effect of P4 tDCS), this study can be considered to have a double-blinded, sham-controlled design, with one within-subject factor of time and one between-subject factor of tDCS group (anodal vs sham). Both researchers and participants will be blinded to the stimulus conditions.

Primary study design

Interventional

Secondary study design

Randomised controlled trial

Study setting(s)

Laboratory

Study type(s)

Treatment

Participant information sheet

Not available in web format, please use the contact details to request a participant information sheet

Condition

Modifications in working memory performance in young non-disabled adults

Interventions

Participants will be randomly assigned by simple randomization with stratification to one of three groups (arms): an anodal tDCS group, a sham tDCS group and a no-tDCS control group. There is one within-subject factor, which is time (pre-tDCS vs post-tDCS assessment on the

mental rotation task), and one between-subject factor, which is the group (true/anodal tDCS, sham tDCS, and no-tDCS).

The intervention used in this study is non-invasive brain stimulation, specifically transcranial direct current stimulation, to be applied to the area of the scalp over the right parietal cortex of the brain.

Intervention Type

Device

Phase

Not Applicable

Drug/device/biological/vaccine name(s)

Transcranial direct current stimulation

Primary outcome measure

Visual memory performance is measured using the Corsi Block Tapping Task which is recorded once during the experiment

Secondary outcome measures

Placebo effects related to non-invasive brain stimulation recorded from an 8-point Likert scale are recorded pre- and post-visual memory practice during a single lab visit

Overall study start date

01/01/2019

Overall study end date

01/05/2024

Eligibility

Participant inclusion criteria

1. At least 18 years old
2. Right-handed
3. Passed the screening questionnaire for tDCS studies (Thair, Holloway, Newport, & Smith, 2017)

Participant type(s)

Healthy volunteer

Age group

Adult

Lower age limit

18 Years

Sex

Both

Target number of participants

120

Total final enrolment

98

Participant exclusion criteria

1. Mixed-handed or ambidextrous
2. Report any diagnosed current psychiatric condition, such as clinical depression or bipolar disorder

Recruitment start date

03/03/2019

Recruitment end date

29/03/2022

Locations

Countries of recruitment

United States of America

Study participating centre

Arizona State University

1151 S Forest Ave

Tempe

United States of America

85281

Sponsor information

Organisation

Arizona State University

Sponsor details

Global Sport Institute

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Sponsor type

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ROR

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Funder(s)**Funder type**

University/education

Funder Name

Arizona State University Global Sport Institute

Alternative Name(s)

Arizona State, This Arizona State University, Territorial Normal School, Tempe Normal School of Arizona, Tempe Normal School, Tempe State Teachers College, Arizona State Teachers College, Arizona State College, ASU

Funding Body Type

Government organisation

Funding Body Subtype

Universities (academic only)

Location

United States of America

Funder Name

Arizona State University Graduate College JumpStart Program

Alternative Name(s)

Arizona State, This Arizona State University, Territorial Normal School, Tempe Normal School of Arizona, Tempe Normal School, Tempe State Teachers College, Arizona State Teachers College, Arizona State College, ASU

Funding Body Type

Government organisation

Funding Body Subtype

Universities (academic only)

Location

United States of America

Results and Publications

Publication and dissemination plan

Planned publication in a high-impact peer-reviewed journal.

Intention to publish date

01/01/2024

Individual participant data (IPD) sharing plan

The online repository that contains all relevant data of this study is managed under this <https://doi.org/10.5281/zenodo.7551889>. Once the manuscript linked to these data is published the researchers shall make the repository open to all.

IPD sharing plan summary

Stored in publicly available repository

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Protocol file			15/05/2024	No	No
Results article		20/04/2024	15/05/2024	Yes	No