

# Understanding the perception of transcranial electrical stimulation (tES) techniques

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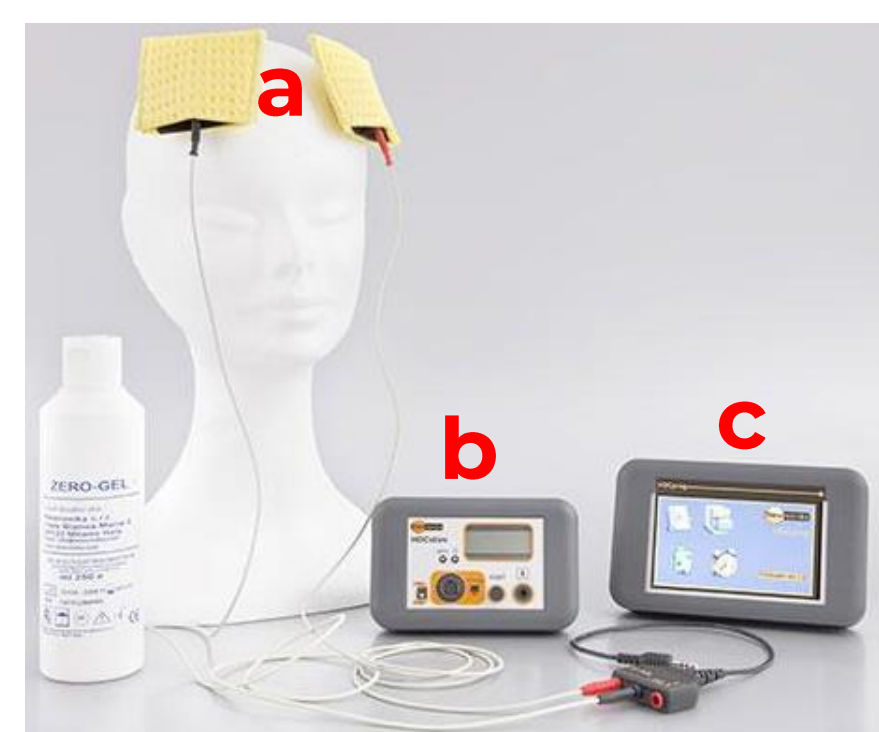
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## 1. Introduction

### What is tES?

A series of techniques where a weak electrical current is passed between electrodes placed on the scalp, resulting in the acute and reversible change of activity in a specific region of the brain, which temporarily modifies behaviour, learning and task performance<sup>1</sup>.



tES equipment comprises of:

- a** Electrodes (housed in saline-soaked sponges)
- b** Stimulation device (powered via 2x AA batteries)
- c** Programming device (set custom parameters)

The use of tES has proliferated over recent years<sup>2</sup>, with the techniques receiving increased coverage in news articles<sup>3,4</sup>. However, depictions of tES tend to be negative or overemphasise the procedures or effects<sup>3-5</sup>. Some of these depictions, and the lack of tES in mainstream medicine, has led to an apprehension around the use of these techniques.

~40% of those eligible to participate do not go on to participate in our studies. This is likely driven by our anecdotal observation of apprehension around undergoing tES procedures, despite the rigorous training, safety and ethical standards we employ.

This study aims to understand the perceptions of tES techniques, both as a general research/medical device and specifically for the modulation of eating behaviours.

## 2. Method

A short (10 – 20 minute) online survey comprising of 57 questions, with participants responding to between 30 and 46 of these questions.



**Sample size:** > 160 participants (72 participants to date)

**Inclusion criteria:** General population, > 18 years

**We are collecting data on:**

Knowledge of tES techniques

Expectation of effects

Perception of safety

Participant characteristics

**Statistical analyses:** Data will be analysed, as appropriate, using:

- Binomial/multinomial logistic regression
- Repeated measures analysis of variance (ANOVA)
- Independent t-tests

## 4. Conclusion

Our data so far suggests there is clear apprehension around the use of tES, and these methods are associated with more invasive and intensive techniques (e.g. electroconvulsive therapy).

This data will provide important considerations for researchers and clinicians using tES, and will improve the understanding of tES, by:

Providing greater detail/information

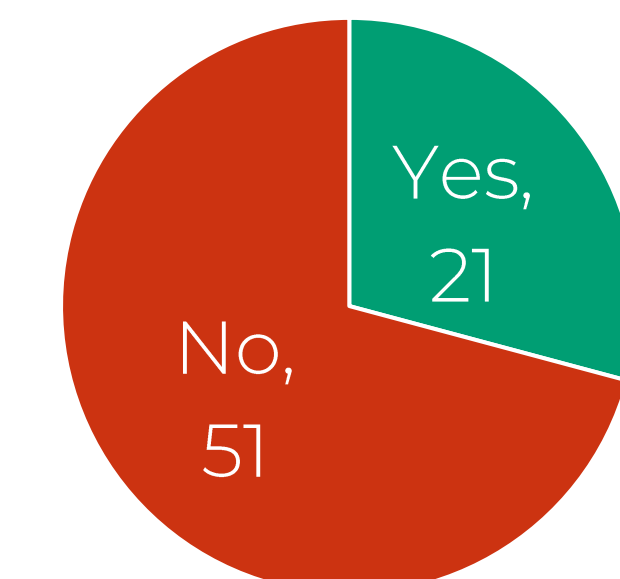
Addressing misconceptions

Addressing barriers with recruitment

## 3. Results (so far!)

### Knowledge of tES

Figure 1: Number of participants with prior knowledge of tES



WORK IN PROGRESS

Twenty-one participants (29%; Figure 1) have previously heard of tES, which was mainly through non-academic sources (n = 12, 57%; e.g. blogs, word-of-mouth). Only 1 participant has previously undergone tES.

### Expectation of Effects

Many participants overestimated the effects of tES, viewing the techniques as potentially damaging or being invasive/intensive:

"Pain and potential for long term damage."

"Frying the brain."

"...it could cause damage to the brain."

However, some were aware of the temporary and varying nature of tES:

"...vary person to person."

"disrupt...signals but only temporarily."

"...impact specific area of the brain."

### Perception of Safety

Participant's perception of safety (safety score) and level of comfort to undergo tES were measured at the following time points:

Baseline

Outline ethical and training requirements

Overview safety literature

Show images of tES equipment

- There was a significant increase in safety score ( $F_{(2,168)} = 6.092$ ,  $p = 0.002$ ,  $BF_{10} = 36.075$ ), and comfort level ( $F_{(3,177)} = 5.514$ ,  $p = 0.002$ ,  $BF_{10} = 17.261$ ); particularly after providing safety information ( $p \leq 0.049$ ) and showing images of tES equipment ( $p \leq 0.005$ ).
- Willingness to undergo tES was predicted by safety score ( $\chi^2(65) = 23.109$ ,  $p < 0.001$ ) and comfort level ( $\chi^2(64) = 39.489$ ,  $p < 0.001$ )

### Willingness to Undergo tES

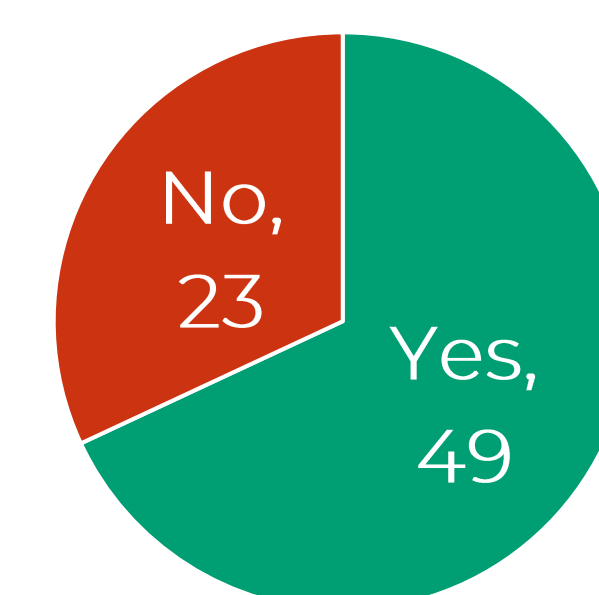


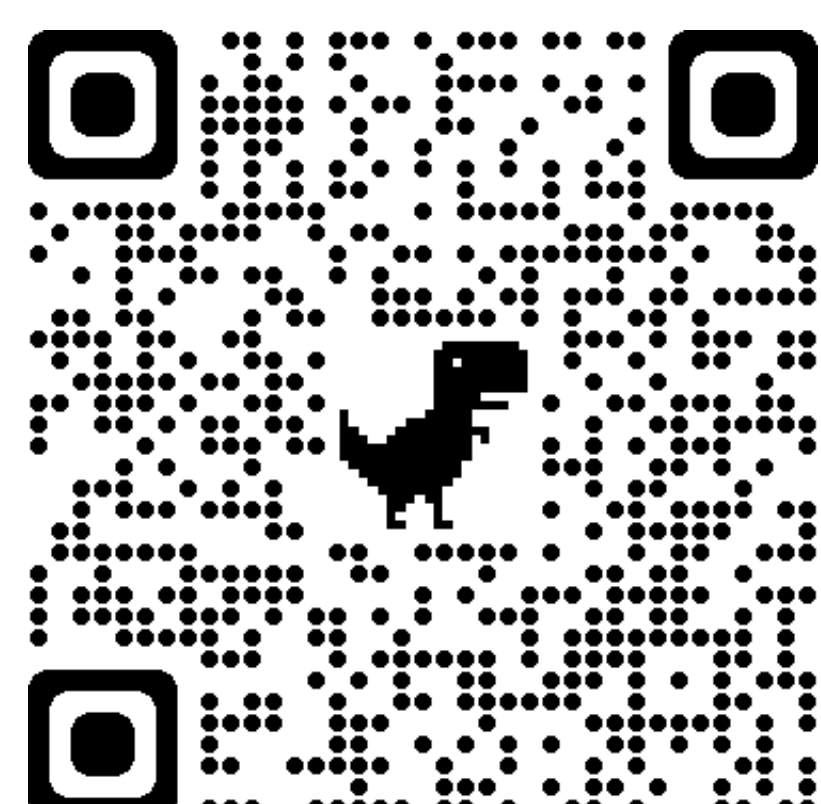
Figure 2: Number of participants willing to undergo tES procedures

By the end of the survey, most (68%, Figure 2) of the participants were willing to undergo tES procedures. However, there was still some apprehension and clear links with other, more intensive, methods:

"Even though I understand that they [ECT and tES] are very different procedures, I think I subconsciously make a link between the two and this makes tES seem more dangerous than it probably is."

### We need your comments!

Scan the QR to complete the survey



<sup>1</sup> Filmer et al. (2014) *Trends Neurosci* 37, 742-753; <sup>2</sup> Lefaucheur et al. (2016) *Int J Clin Neuropsych* 46, 319-398; <sup>3</sup> Ingle (2015) *The Guardian*, 06 Mar; <sup>4</sup> Devlin (2019) *The Guardian*, 25 Jan; <sup>5</sup> Katwala (2019) *Wired*, 29 Jul.